

VOL. XXXIX No. 7

JULY 1954

MECCANO

MAGAZINE



32-INCH ROLLING MILL AT CORBY

9^d

THE MECCANO MAGAZINE

DINKY TOYS

TRADE MARK REGD.

NEW

this month!



AUSTIN CHAMP MILITARY VEHICLE No. 674

A British Army counterpart of the famous American "Jeep". Robust, manoeuvrable and speedy . . . there is no limit to the usefulness of this all-purpose vehicle. The finely-detailed Dinky Toys model steps right into place alongside the other recent introductions of military vehicles. Complete with driver and spare wheel, it is enamelled in service green and has Royal Armoured Corps sign on front and rear. It measures $2\frac{5}{8}$ " in length.

PRICE 3/6



G.P.O. PILLAR BOX No. 760

Here is a road accessory that can be used to excellent effect with every collection of Dinky Toys. It represents the latest type with Crown and Royal Cipher. In G.P.O. red with black base. Height $1\frac{3}{8}$ "

PRICE 10d.

*Prices
include
Purchase
Tax*

MADE IN ENGLAND BY MECCANO LIMITED

DINKY TOYS

TRADE MARK REGD.



No. 480
Bedford 10 cwt. Van "Kodak"
Length $3\frac{1}{4}$ in. 2/9



No. 621
3-Ton Army Wagon
Length $4\frac{3}{8}$ in. 4/9



No. 252 (25v)
Refuse Wagon
Bedford Chassis
Length $4\frac{1}{2}$ in. 5/10



No. 422 (30r)
Fordson "Thames" Flat
Truck
Length $4\frac{1}{8}$ in. 2/8



No. 430 (25x)
Breakdown Lorry
Length $4\frac{3}{4}$ in. 5/6



No. 154 (40f)
Hillman Minx
Length $3\frac{1}{2}$ in. 2/2



No. 158 (40a)
Riley Saloon
Length $3\frac{1}{2}$ in. 2/2



No. 673
Scout Car
Length $2\frac{5}{8}$ in. 2/11



No. 623
Army Covered Wagon
Length $3\frac{7}{8}$ in. 3/7



No. 470
Austin Van "Shell/B.P."
Length $3\frac{1}{2}$ in. 2/11



No. 157
Jaguar XK120 Coupé
Length $3\frac{7}{8}$ in. 2/8



No. 343 (30n)
Farm Produce Wagon
Length $4\frac{1}{2}$ in. 3/6



No. 401 (14c)
Coventry Climax
Fork Lift Truck
Length $4\frac{1}{2}$ in. 6/6



No. 651
Centurion Tank
Length 5 in. 7/11



No. 301 (27n)
Field-Marshall Tractor
Length 3 in. 4/6

MADE IN ENGLAND BY MECCANO LIMITED

REAL MOVIE SHOWS AT HOME!



with the

PEAK 16 mm. CINE PROJECTOR

Two projectors in one—movie and still. Easy to operate. No technical knowledge required. A STURDY machine at an

AMAZINGLY LOW PRICE.

BUILD UP A COMPLETE SHOW!
Extra FILMETTE LOOPS

Black and White 1/- each Colour 1/6 each

Completely safe—non-inflammable film.

ZOO, CIRCUS, CHARLIE CHAPLIN, COMEDIES, SPORT, CORONATION, PAGEANTRY, WESTERNS, ETC.

AND COMING ATTRACTIONS

8ft. "FILMETTES" !!

30 Black and White Titles.....4/- each

15 Colour Titles.....6/- each

Assorted Titles.

Wonderful Home Entertainment!

**THE ONLY 16 mm. FILM PROJECTOR of its kind
FROM TOY SHOPS, HOBBY SHOPS & STORES**

or write for name of nearest stockist to Sole World Distributors:

J. S. FRIEZE & CO. LTD., 37 Devonshire St., London W.1. Welbeck 2994 (3 lines)

MARKLIN - FALLER

LIONEL - KIRDON - PECO

WRITE



REGD. TRADE MARK

TO-DAY



**FOR OUR
140-PAGE
CATALOGUE**

WRENNS FLEXIBLE 3-RAIL TRACK

18" LENGTH 3/2 36" LENGTH 6/2
POINTS, CROSSOVERS AND CROSSINGS

SUBURBAN STATION KIT

THE LATEST MODEL CRAFT ITEM
PRICE 7/- COMPLETE

To

TAYLOR & McKENNA,
98 CRAVEN PK. RD., HARLES DEN,
LONDON N.W.10. Phone ELGAR 3573

Please send by return one copy of "The Complete Model Railway Catalogue." 2/6 P.O. enclosed.

NAME.....

ADDRESS.....

JMM

FOR THE LARGER LAYOUT IN "O" OR "OO"

TRANSFORMER A.C.6 BY KIRDON UP TO 20 VOLTS A.C. AT 6 AMPS 47/6

LIGHTING TRANSFORMER BY KIRDON 2.5 VOLTS AT 3 AMPS. ONLY 15/-
FOR 230-250 A.C. MAINS.



Worth looking into!

**Get more fun out-of-doors
with a pair of these super Binoculars!**

MERIT 'COMMANDER' BINOCULARS

(Below, left). Long-range Binoculars. Increased focal length gives extra range and very clear definition. The body extension helps to exclude glare. Beautifully designed and strongly moulded, with leather-grained effect, and centre screw focus adjustment.

Retails at
10/6

Unbreakable lenses. Complete with lanyard. Packed in attractive carton.



MERIT 'OLYMPIC' BINOCULARS

(Top right). High quality, low priced Binoculars for the younger child, beautifully designed in the shape of prismatic Binoculars, simple to use, fixed focus and unbreakable precision lenses giving excellent magnification. Moulded in black with leather grained effect, complete with lanyard, and packed in attractive coloured carton.

Retails at
5/11



MERIT 'PATROL' BINOCULARS

(On left). Light-weight, fixed-focus Binoculars, ideal for all outdoor occasions. Optically perfect unbreakable lenses give clear vision for a great distance. Complete with lanyard, in attractive carton.

Retails at
4/11



MERIT 'RAMBLER' BINOCULARS

(Above). All-plastic, with unbreakable lenses. Individual eyepiece focusing and central hinge. Complete with lanyard. In attractive coloured carton.

Retails at
6/11

All these Binoculars are fitted with our high quality optical lenses. Make sure you ask for and obtain one of these fine Merit Binoculars by insisting on Merit and refusing any inferior make.

Of all good dealers and stores

Send postcard for details of other outstanding lines

J. & L. RANDALL LTD

ASSOCIATED COMPANY: SIGNALLING EQUIPMENT LTD

Makers of S.E.L. Precision Products

**(Dept 3), MERIT HOUSE,
POTTERS BAR, MIDDLESEX**

Hurry to WIN!

CLOSING DATE 17th JULY, 1954

1,000 PRIZES

OF BIG BOXES OF ASSORTED CHOCOLATE BARS

FRY'S 'MAKE-A-FACE' competition

(1) With a pencil or crayon, copy the shape on to a sheet of paper about 10" x 8". (2) Now complete the picture by turning the shape into a face. (3) Write, in block capitals, in the top right hand corner, your full name, age and address. (4) Write, in the bottom left hand corner, the names of the *three* Fry's Chocolate Bars you like best. (5) Attach any two complete wrappers from Fry's Chocolate Bars. (6) Post (2½d. stamp on envelope) to Fry's Competition Dept. M2, Somerdale, Bristol.

This example shows just what can be done with the shape—but do not copy it! Prizes will be awarded for skill and originality.

The competition is open to children from 5—15 (inclusive). Prizes will be awarded in each age group. Send as many entries as you like—but each must be accompanied by two Fry's Chocolate Bar wrappers.



I'm
pleased
as



it's delicious!

FREE novelty game for every entrant!

Size 11 x 14

Entries restricted to residents in Gt. Britain and Northern Ireland



56'- EACH



drive. Universal coupling. Ackermann-type steering. Floating rear bogie. Rubber tyres. Powerful Spring Drive. Comes ready assembled.

SCALE

MODEL LORRY

You can Dismantle it—Just like the real thing!

Made up from 65 standardised parts—all replaceable. Shaft

DYSON 8-TON TRAILER

Attaches to rear of the FODEN LORRY. And dismantles in the same manner.

17'6
EACH

★ ASK YOUR DEALER TO SHOW YOU THESE WONDERFUL MODELS!
ABBAY-CORINTHIAN GAMES COMPANY • LONDON S.W.1

Tri-ang MINIC

Regd. Trade Mark

PUSH AND GO

SCALE MODELS

Each of these fine scale models is fitted with a special power unit which requires no key. A steady push is all that is needed to start them on a long, fast run.

There are many different vehicles from which to choose. Start collecting today so that you can get together a fleet of these wonderful scale models that will impress your friends and enable you to be your own Minister of Transport.



**A STEADY PUSH
AND AWAY THEY GO!**



TRI-ANG MINIC PUSH-AND-GO
JOWETT "JAVELIN."

Length $4\frac{3}{4}$ in. Price 3/3

TRI-ANG
MINIC
PUSH-AND-GO
CONTAINER LORRY.
Length $3\frac{1}{8}$ in. Price 2/-



TRI-ANG MINIC PUSH-AND-GO
OOO DOUBLE DECK BUS.

Length $4\frac{1}{8}$ in. Price 3/-



TRI-ANG MINIC PUSH-AND-GO
MORRIS 10 cwt. VAN.

Length $3\frac{1}{2}$ in. Price 2/9



TRI-ANG MINIC PUSH-AND-GO
RILEY POLICE CAR.

Length $4\frac{3}{4}$ in. Price 4/6

OBTAINABLE
FROM YOUR
LOCAL
TOY
SHOP
WE DO NOT
SUPPLY DIRECT



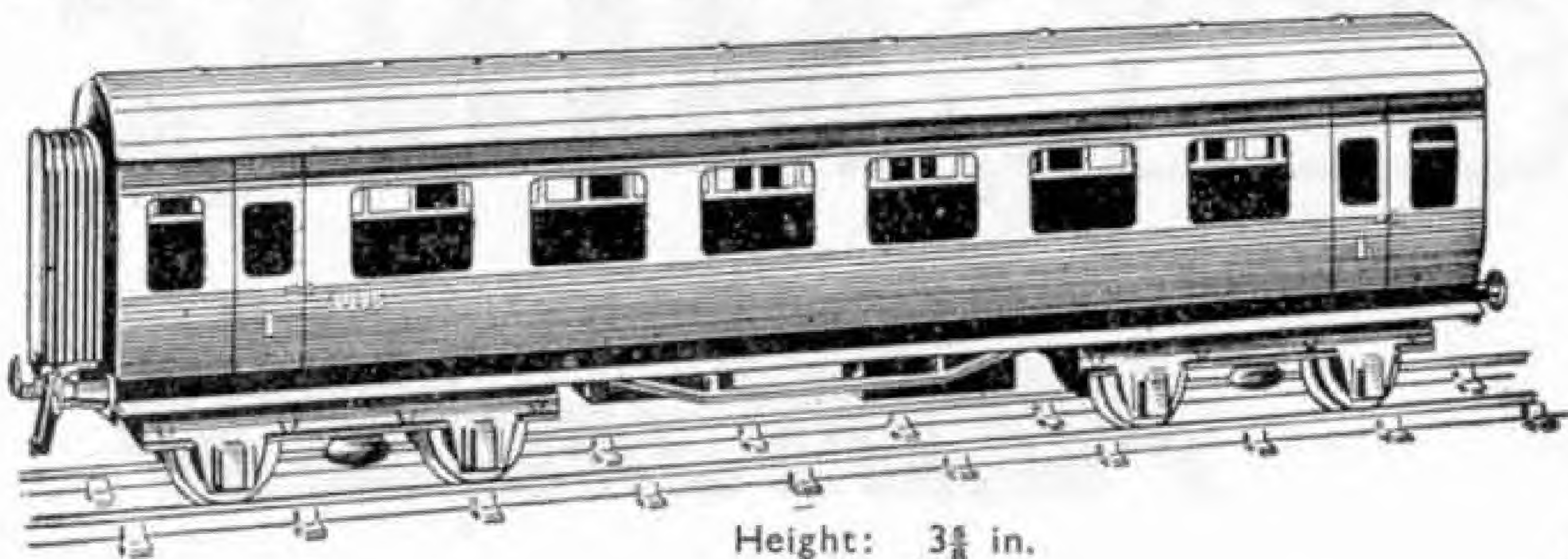
TRI-ANG MINIC PUSH-AND-GO
No. 3 CRASH TRUCK.

With electric spotlight.

Length $9\frac{1}{2}$ in. Price 17/6

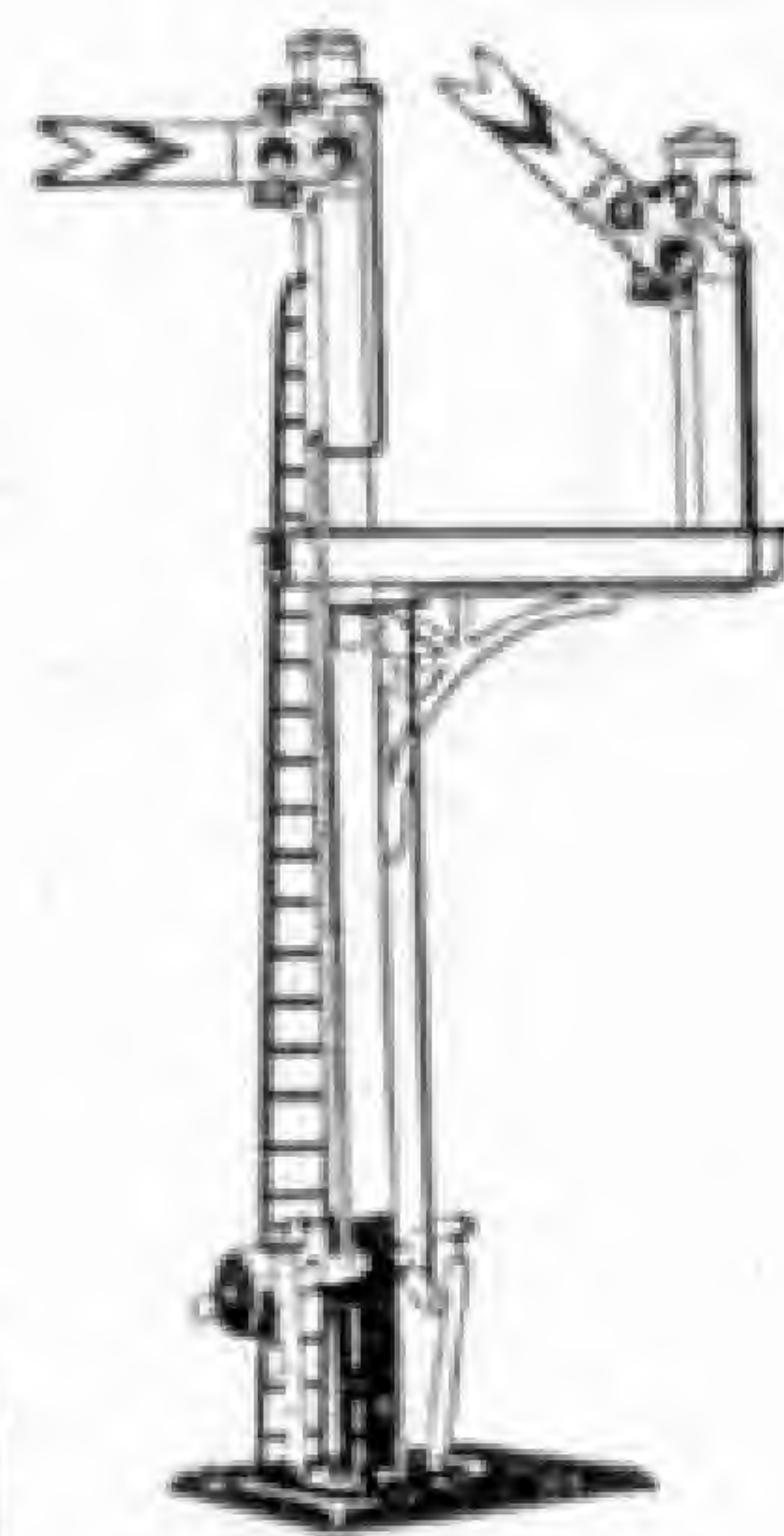


B.R. PASSENGER COACHES



Height: $3\frac{1}{8}$ in.
Length: $13\frac{3}{4}$ in.

AND ACCESSORIES



The all-steel constructed Passenger Coach illustrated is one of three available in authentic B.R. Lake and Cream colours. A compensating bogie is fitted, also corridor connections.

This and its companion 3rd class Corridor Coach and Brake End will be an attractive feature of your railway system. Price only 2 gns. each including purchase tax.

In addition to the above we have three L.M.S. type steel goods vans ranging in price from 9/11 to 14/- including purchase tax.

Bracket Signal illustrated costs 16/4, double arm models, complete with ladders and red and green spectacles are available.



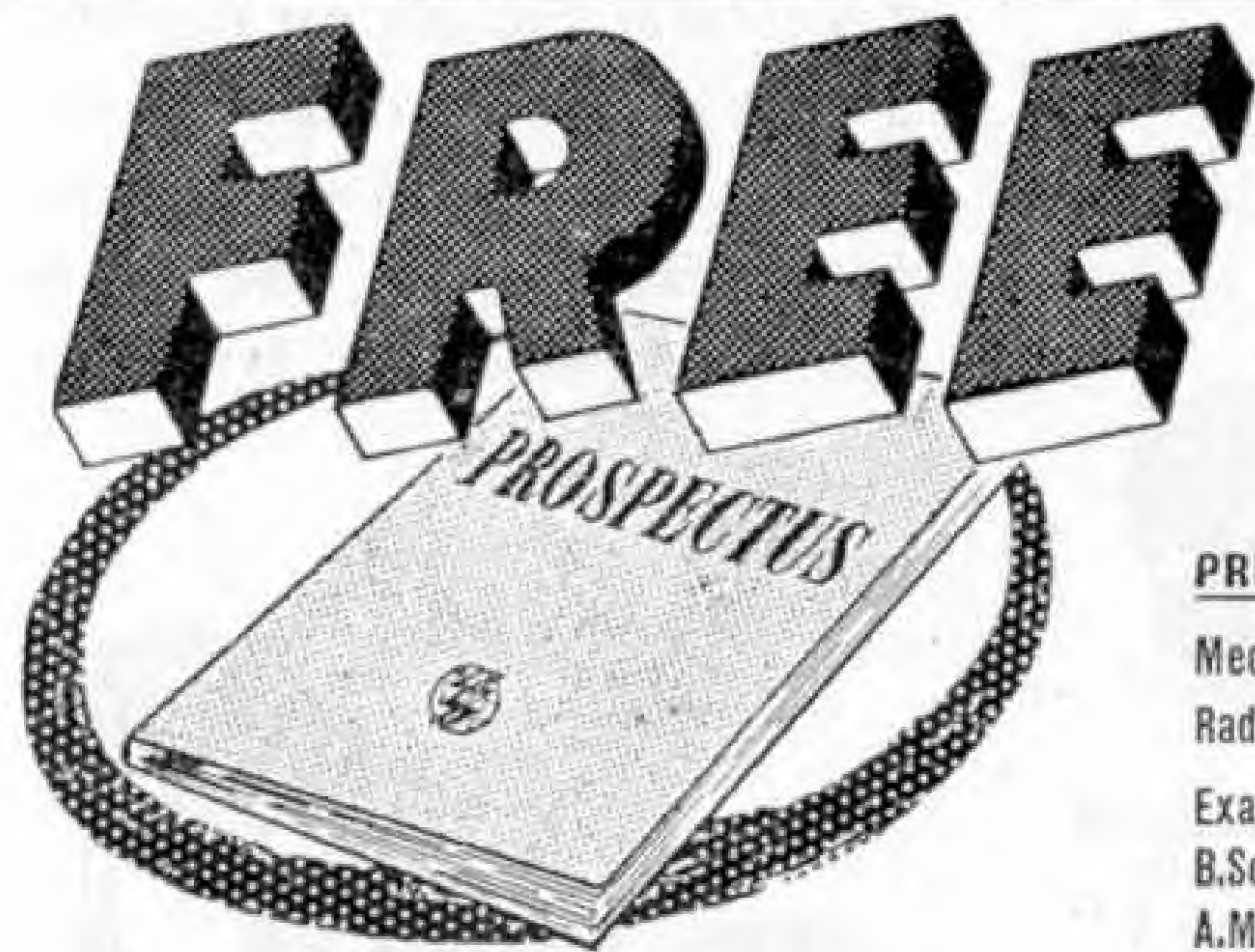
BASSETT-LOWKE LTD.

Head Office and Works: **NORTHAMPTON**

LONDON: 112 High Holborn, W.C.1. **MANCHESTER:** 28 Corporation St.



Write today for Gauge 'O' Catalogue quoting ref. GO.17. Comprehensive, detailed, containing over 40 pages of New Locomotive models, accessories, etc. Price 1/6.



**POST THE COUPON TODAY FOR
OUR BROCHURE ON THE LATEST
METHODS OF HOME TRAINING FOR
OVER 150 CAREERS & HOBBIES**

PRIVATE AND INDIVIDUAL TUITION IN YOUR OWN HOME

Mechanical Engineering Automobile Engineering Civil Engineering & Building
Radio & Television Electrical Engineering Aeronautical Engineering
Examination Courses for: - General Certificate of Education, B.Sc.(Eng.), Common Preliminary, and for A.M.I.Mech.E., A.M.I.C.E., A.M.Brit.I.R.E., A.F.R.Ae.S., A.M.I.P.E., A.M.I.M.I., A.M.I.H. & V.E., M.R.San.I., A.M.I.E.D., A.M.S.E., L.I.O.B., City & Guilds Certificates, etc. Courses also for Commerce and Business Management.

The advantages of E.M.I. training.

- ★ The teaching methods are planned to meet modern industrial requirements.
- ★ We offer training in all subjects which provide lucrative jobs or interesting hobbies.
- ★ Tutor personally allotted by name to ensure private and individual tuition.
- ★ Free advice covering all aspects of training is given to students before and after enrolling with us.

Courses from £1 per month

E.M.I. INSTITUTES

The only Postal College which is part of a world-wide Industrial Organisation.

POST THIS COUPON TODAY

Please send without obligation your FREE book.

E.M.I. INSTITUTES, Dept. 197, 43 Grove Park Road, London, W.4. Phone: Chiswick 4417/8.

NAME.....

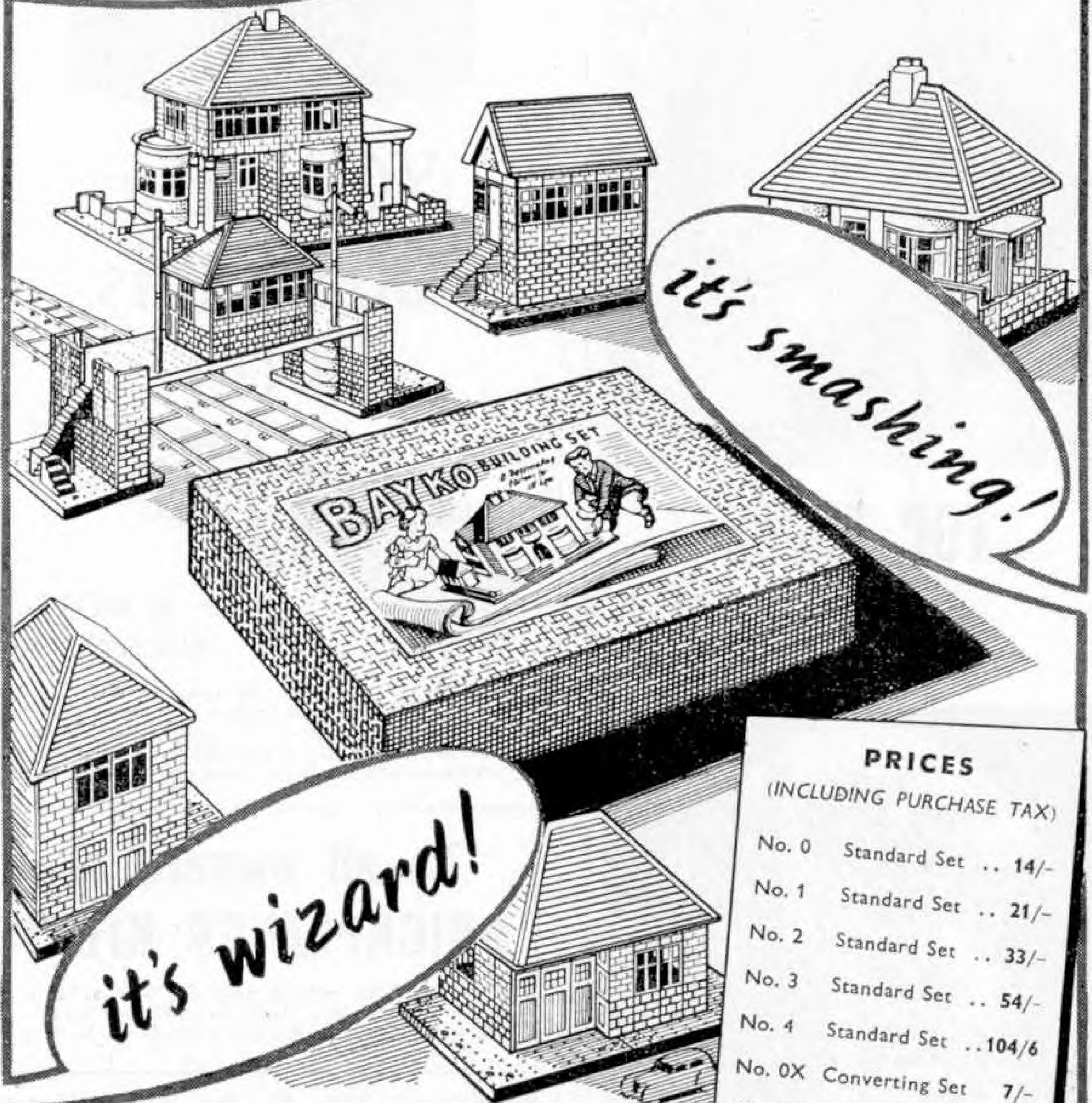
ADDRESS.....

SUBJECT(S) OF INTEREST.....

JULY

Oh Boy **BAYKO!**

Bayko builds scores of beautiful models, including Railway Stations, Signal Boxes, Bridges, Houses, Public Buildings, etc.



it's wizard!

it's smashing!

**OBTAINABLE FROM
LEADING STORES AND
TOY SPECIALISTS**

PRICES

(INCLUDING PURCHASE TAX)

No. 0	Standard Set ..	14/-
No. 1	Standard Set ..	21/-
No. 2	Standard Set ..	33/-
No. 3	Standard Set ..	54/-
No. 4	Standard Set ..	104/6
No. 0X	Converting Set	7/-
No. 1X	Converting Set	12/3
No. 2X	Converting Set	21/-
No. 3X	Converting Set	50/6

ILFORD FILMS

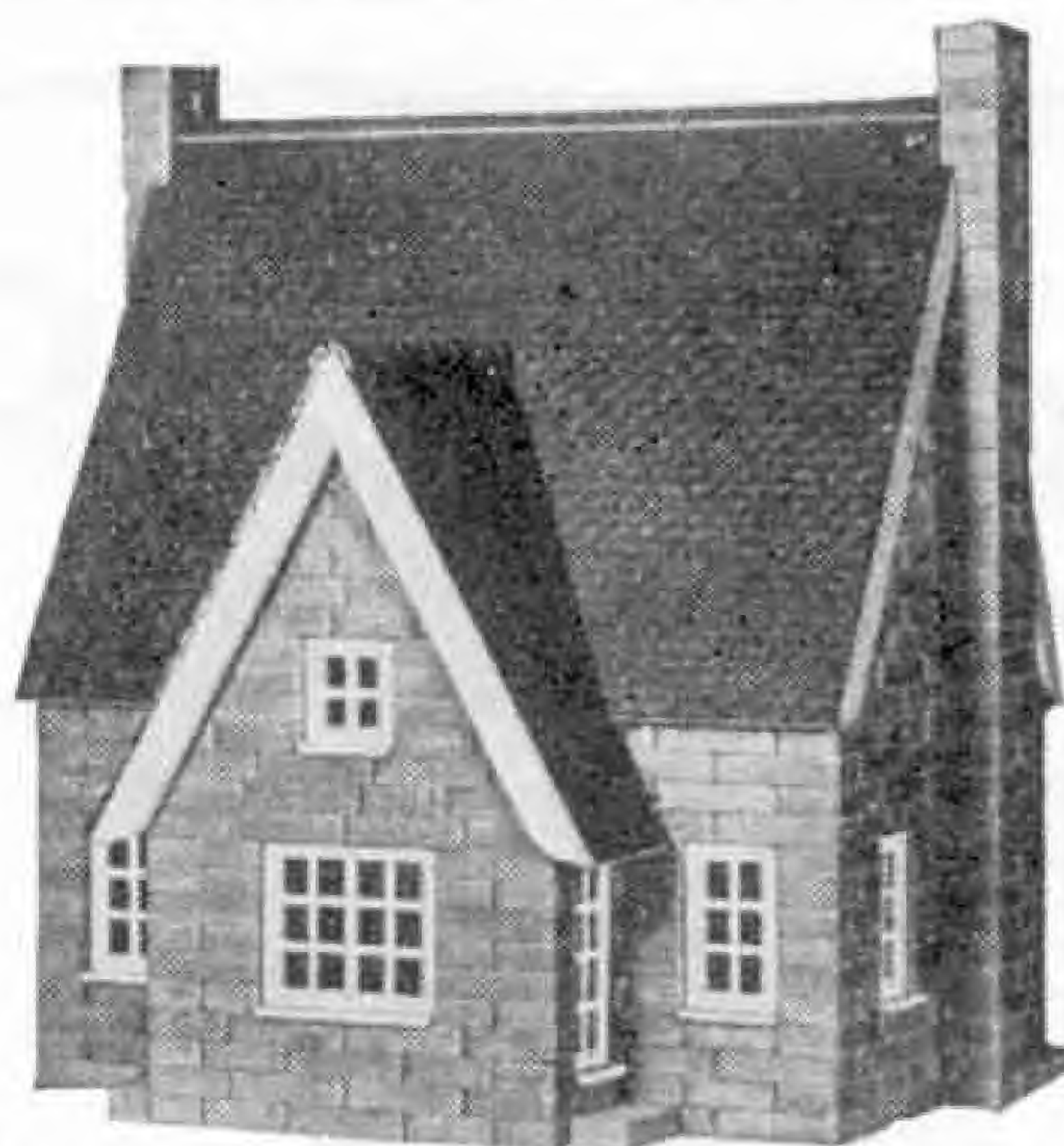


for faces
& places



Much Wenlock

ILFORD FILMS FIT ALL POPULAR CAMERAS



YOU can
build this
INN

WITH

BRICKPLAYER

BRICK & MORTAR
BUILDING KIT

It enables you to build Garages, Houses, Railway Stations, Signal Boxes, or from your own imagination. All railway models will fit 'O' gauge scale. Buildings can be permanent, or dismantled by merely soaking in water and the bricks used again and again.

To all owners of BRICKPLAYER KIT 3

If you want to convert your Kit 3 into Kit 4, which enables you to build six additional models, ask your dealer for Accessory Outfit 3A at 25/6

BRICKPLAYER KITS AT 25/6 AND 47/6 ARE AVAILABLE FROM GOOD TOYSHOPS, HOBBY SHOPS AND DEPARTMENTAL STORES

If your dealer cannot supply, write for address of nearest stockist to:

J. W. SPEAR & SONS LTD.
DEPT. M • ENFIELD • MIDDLESEX

What a marvellous bike!

No wonder Reg. Harris rides a RALEIGH!

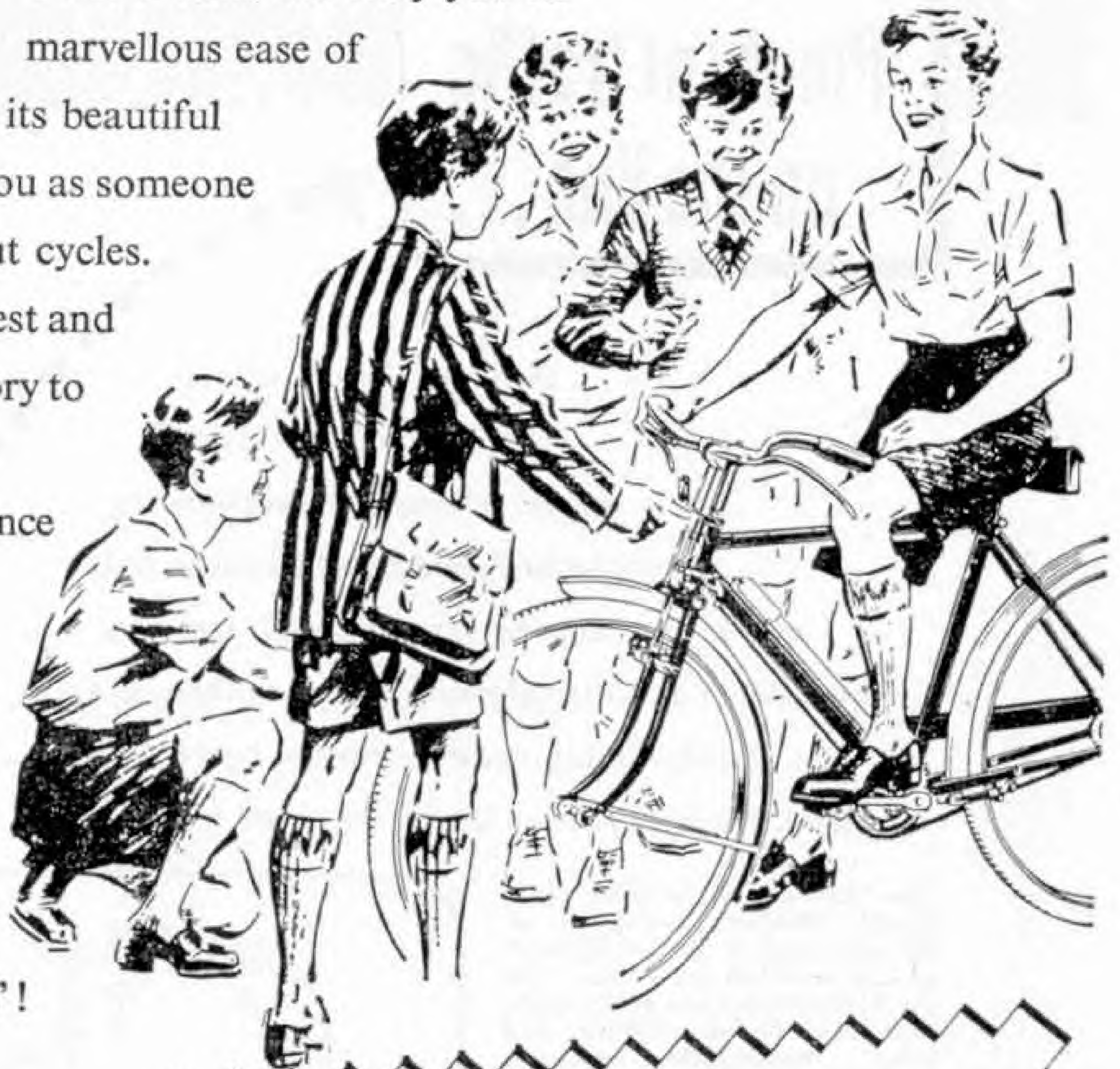


Reg. Harris, World's Professional Sprint Champion three times in succession, knows what's what when it comes to cycles. Follow his example and choose a Raleigh.

Your friends will envy you its marvellous ease of

running, they'll admire its beautiful finish, and look up to you as someone who really knows about cycles.

It takes the world's largest and most modern cycle factory to build cycles of Raleigh quality. All the experience of craftsmen used to building cycles for champions goes into every Raleigh model. So make up your mind now. Decide on Raleigh, it's 'the tops'!



Prices from £11.19.6 (Tax Paid)

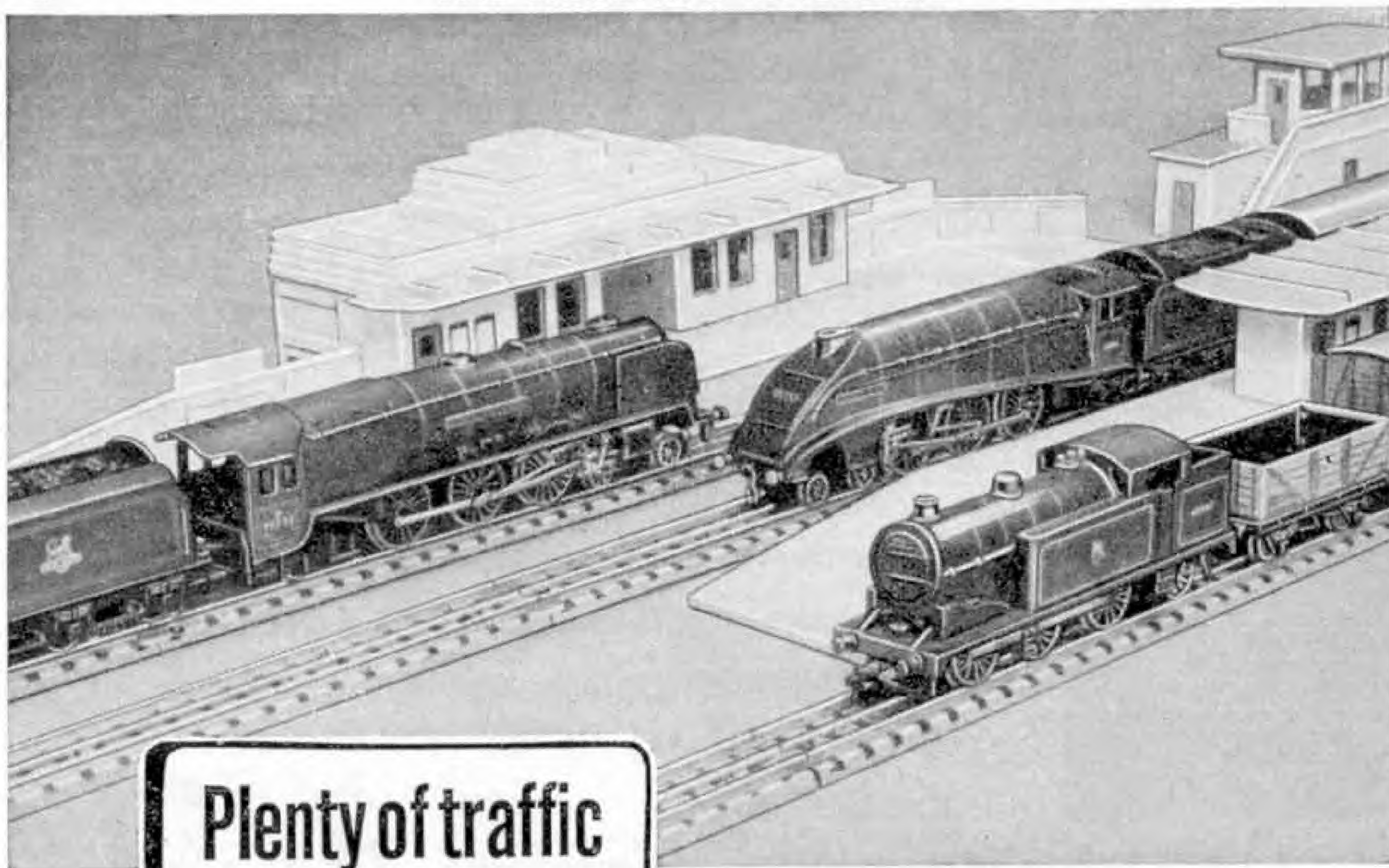
Ask your dealer for a catalogue and full details of our special Easy Payments Scheme (deposit £2)

RALEIGH

NO CYCLE IS COMPLETE WITHOUT A STURMEY-ARCHER 3- or 4-SPEED GEAR AND DYNOHUB

A Product of Raleigh Industries Ltd., Nottingham

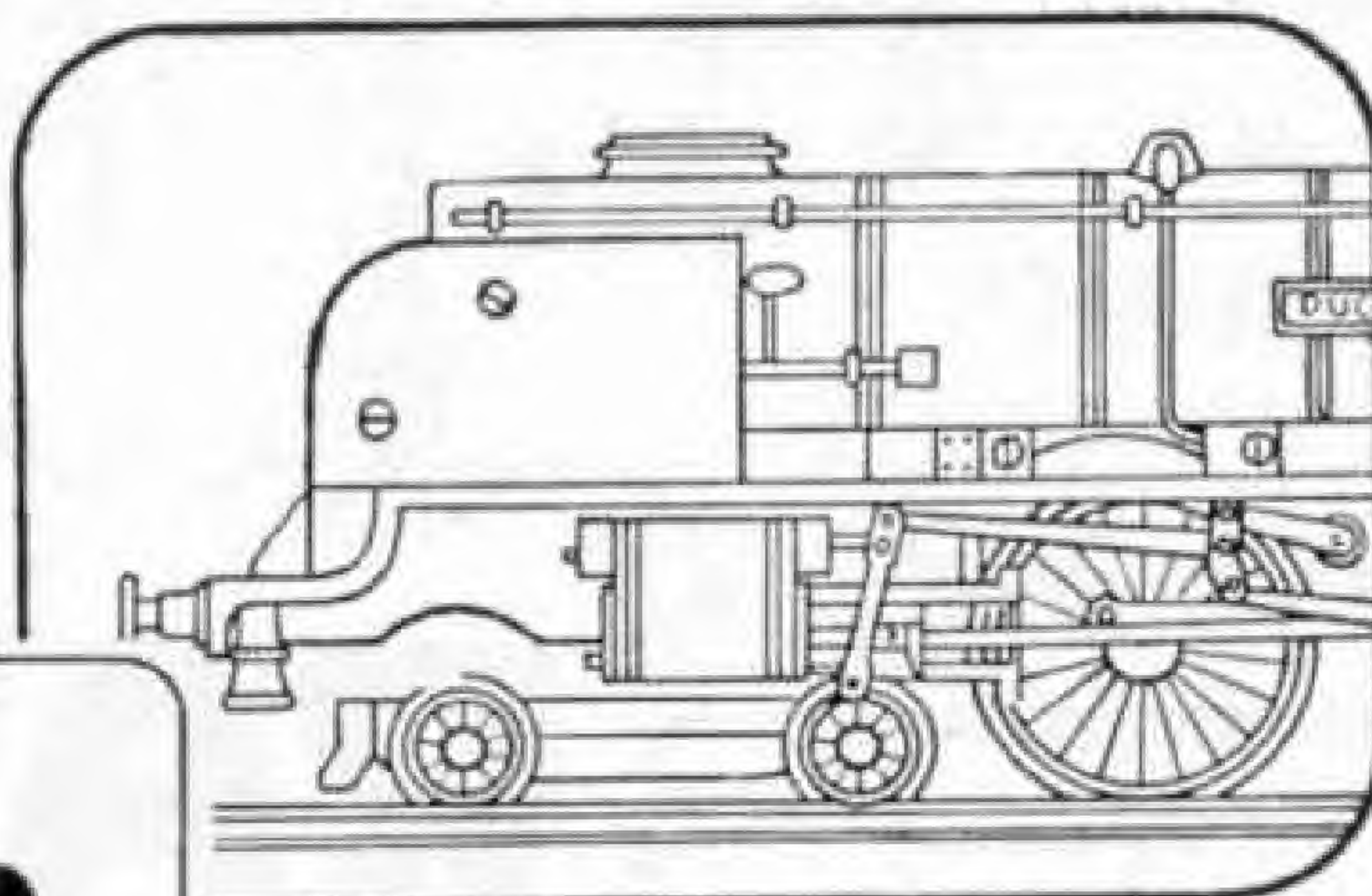
RC.185D



**Plenty of traffic
on the line...**

Hornby-Dublo offers unrivalled value in scale-model railways. The engineering precision and solid metal which go into every part ensure long life and accurate operation. For *lasting* pleasure there's nothing to equal the Hornby-Dublo system, worked by remote control. A whole railway can be set up on a table.

The 'Duchess of Montrose' is a superb 'Pacific' Locomotive of the type used by British Railways to haul main line expresses. Note the Walschaerts valve gear, smoke deflectors, double chimney and other wonderfully accurate modelling on this Hornby-Dublo Locomotive.



**HORNBY
DUBLO**
ELECTRIC TRAINS

**MADE BY
MECCANO LTD.**

Next Month: "ATOMIC AGE FIGHTERS." By John W. R. Taylor

MECCANO

MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

EDITOR : FRANK RILEY, B.Sc.

Vol. XXXIX
No. 7
July 1954

A Wonderful Moment

I could not resist reproducing the picture that you see on this page. It was a great moment for John Franklin when Her Majesty The Queen, with a warm and friendly smile, asked him if his Meccano windmill worked.

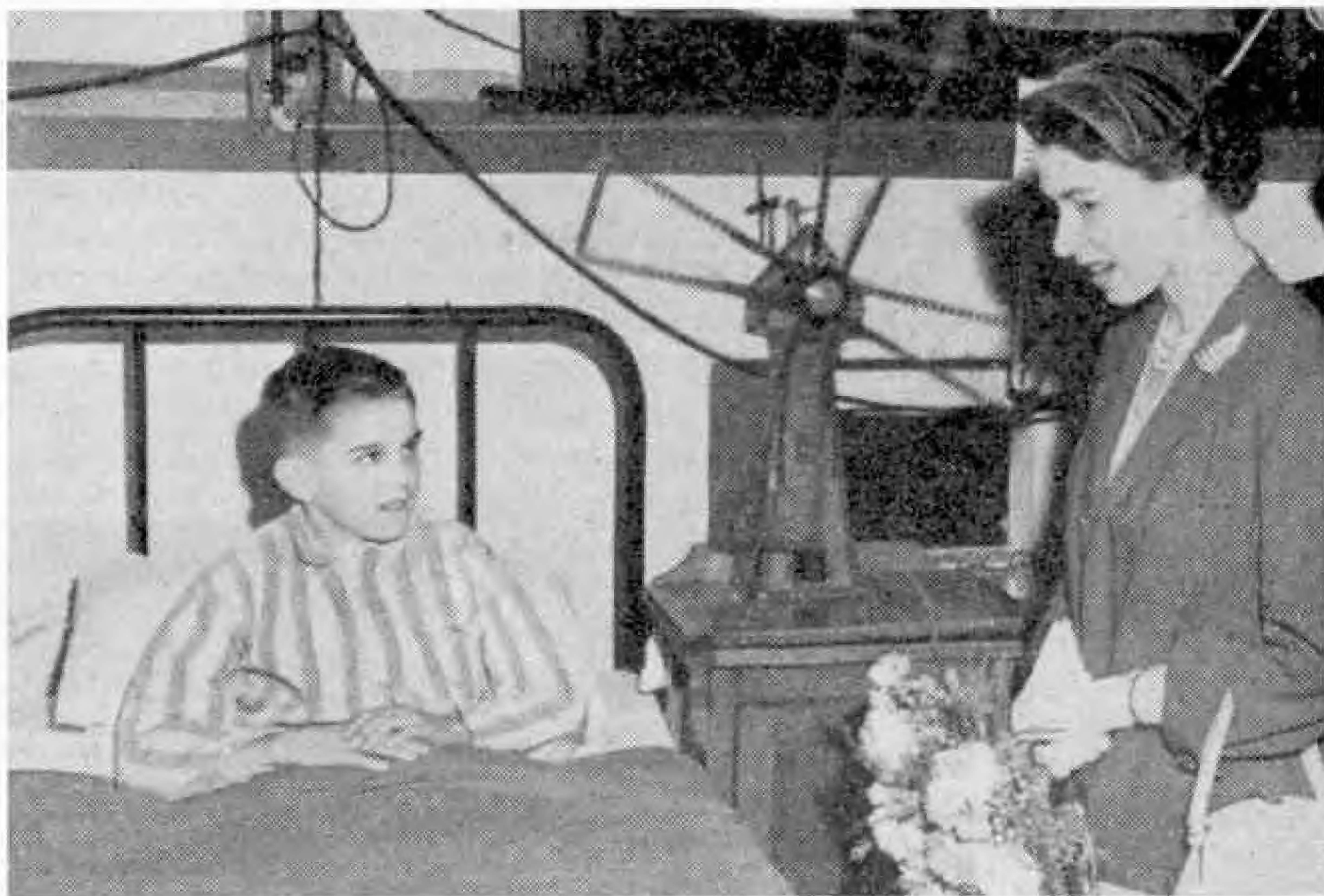
John was a patient in Christchurch Hospital at the time of the visit of Her Majesty and the Duke of Edinburgh to the city of Christchurch, New Zealand. He had brought his Meccano Outfit with him to hospital, and the windmill that he had constructed with it was alongside his bed when the Queen reached him. When Her Majesty wished to know if it worked he seized eagerly on the opportunity of showing that it did.

This was only one of countless little encounters during the Royal Tour, in Australia and in every other part of the Commonwealth that the Queen visited as well as in New Zealand. But it was typical, and John Franklin, like everyone else to whom she and the Duke of Edinburgh spoke, even if only for a moment, will long remember the thrill that came from such friendly and sincere interest.

Next Month

Last month I promised you that from this issue you would learn the truth about the donkey, news that was received with amusement in some quarters. You may

find Mr. Ferry's article, on page 328, a little humorous in places, but I think you will enjoy it greatly and that from it, like myself, you will acquire a new respect for



A great thrill for John Franklin, who had the pleasure of setting his Meccano windmill to work for Her Majesty the Queen during her visit to Christchurch Hospital, New Zealand. Photograph by courtesy of the "Star-Sun," Christchurch.

this patient and unassuming animal.

I went to sea a little while ago. Well, perhaps not to sea—but I was afloat, in the fine steam tug *Fighting Cock*, helping to tow a liner from a Birkenhead dock to the Princes Landing Stage. The story of what I saw on this trip will be one of the special features of the August *M.M.*, the cover of which will be a splendid picture of the very tug in which I threaded my way down the Birkenhead Docks and crossed the broad estuary of the Mersey itself.

The Editor



From Iron Ore to Steel Tubes

Scenes in the New Works at Corby

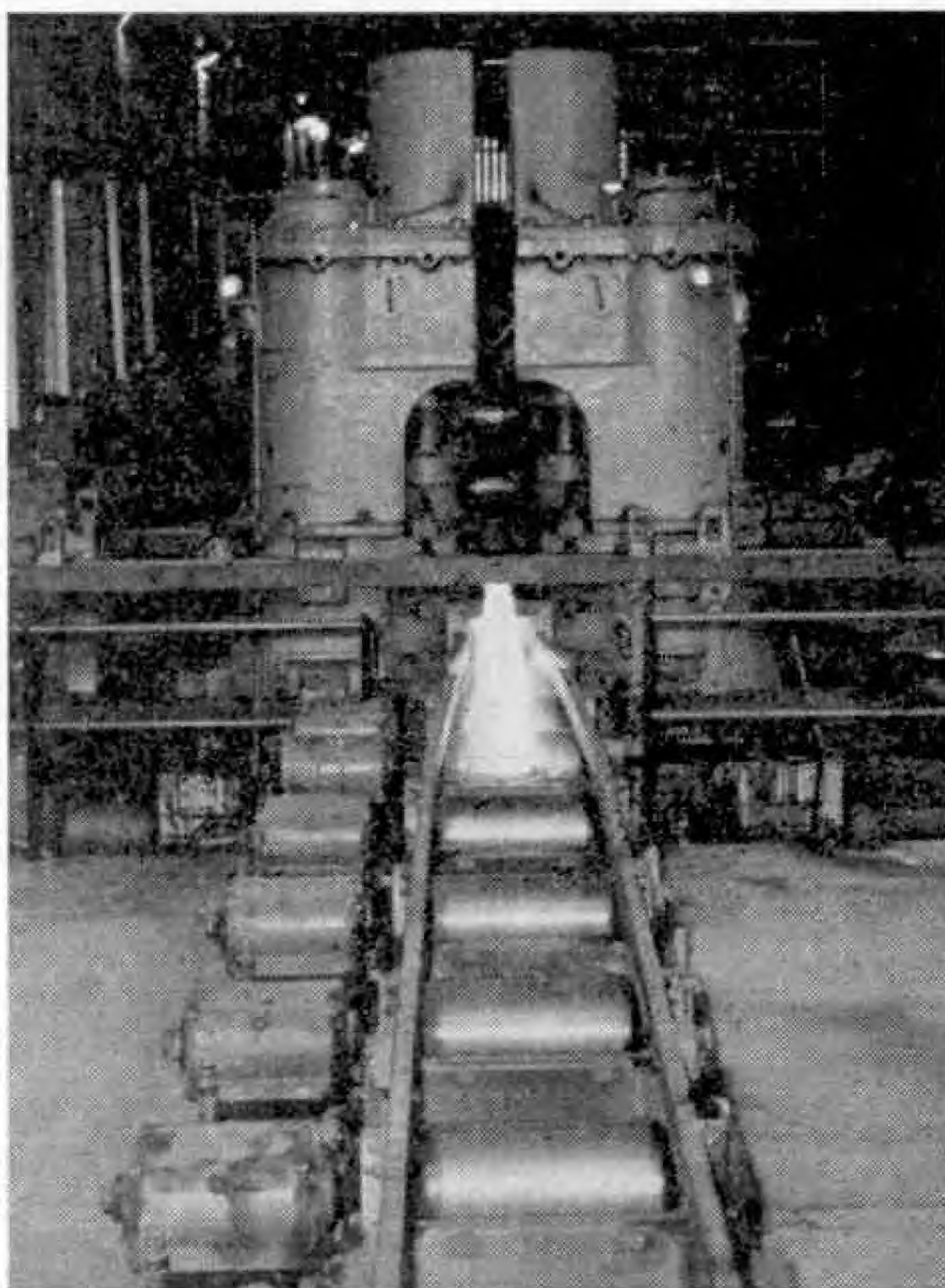
By the Editor

UNTIL about 20 years ago Corby, in Northamptonshire, was just a typical old English village, with narrow winding streets, cottages with thatched roofs and a church about 300 years old. Side by side with it today is a modern town, with more than 18,000 inhabitants, well provided with shops and playing fields, and having a picture house that holds 1,000 people. The reason for this transformation lies underneath the soil on which Corby stands, and indeed stretches from South Lincolnshire to Oxfordshire. It is a bed of ironstone that covers an area of about 116,000 acres.

It was known more than 2,000 years ago that there was iron ore in the ground, and that it was dug out and smelted then is shown by the presence of early slag heaps and the finding of the skeleton of a Roman soldier in the neighbourhood. The village indeed is mentioned in the Domesday Book as an iron producing centre, and at one time the district was as famous as the Sussex Weald for its iron production. It formed part of the dense Royal Forest of Rockingham, the trees of which provided the charcoal then used in smelting the iron ore. Production began to decline about 500 years ago, and it came to an end eventually when laws were passed limiting the cutting

down of trees for making charcoal.

The vast extent of the ironstone deposits in the Corby area was first realised when many deep cuttings were made just over a hundred years ago, as Britain's railway system was being developed. In the meantime the use of charcoal for smelting had come to an end, and coke had taken its place. Eventually a small iron works



At the head of the page is a general view of the No. 1 Strip Mill at the Corby Works, and on the right a slab can be seen entering the edging mill and scale breaker. We are indebted to Stewarts and Lloyds Ltd. for our illustrations and for the photograph on which our cover is based.

came into existence at Corby in 1910, but it was not until 20 years later that the vast development of today was planned.

The firm responsible for this is Stewarts and Lloyds Limited, which was formed by the amalgamation of two concerns making steel tubes, one in Glasgow and the other in Birmingham. Much of the steel that is most suitable for making the welded tubes for which Stewarts and Lloyds have become so well known was imported, but it seemed likely that the mines that the company had acquired in Northamptonshire and the adjoining counties of Rutland and Leicestershire would permit the manufacture of equally suitable steel. This proved to be the case, so the works were planned and erected to form a complete unit, making steel from the ore mined in the area and manufacturing welded steel tubes from it.

The ironstone of Corby lies in flat beds

The rolled strip is coiled and the coils are transferred on slow moving cooling conveyors to the coil banding station.

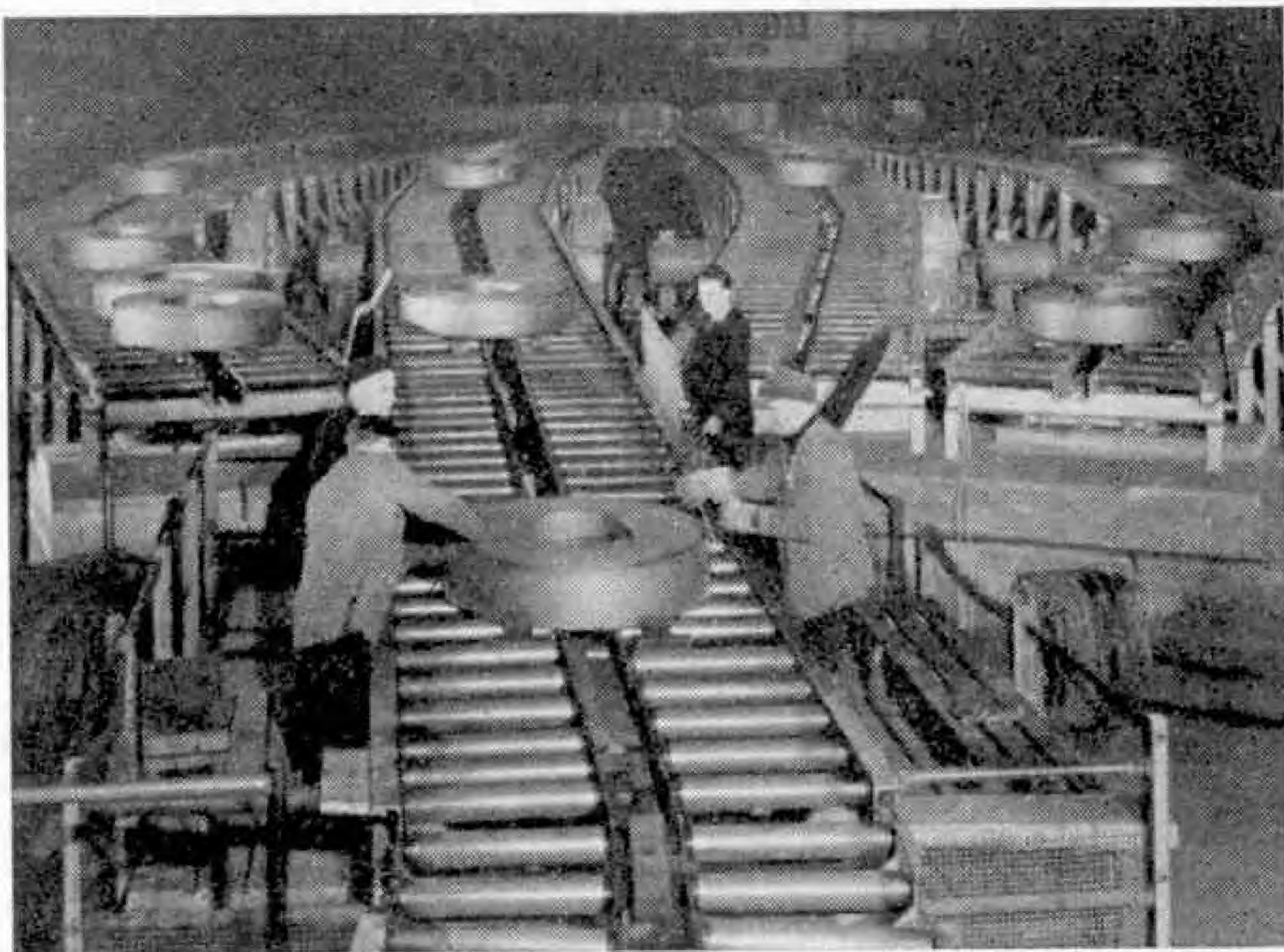
from 8 to 10 ft. thick under soil or overburden that varies in thickness. It is mined by the process of removing the overburden and then digging out the ore. The most recent excavators introduced for this purpose are walking draglines, one of which, the largest in the world, was described and illustrated in the *M.M.* for April of 1952. This giant has a boom or jib 282 ft. long, so that it can stretch almost the length of a football field. It weighs 1,600 tons, and its bucket will hold about 27 tons of excavated material.

The ore that is dug out of the ground by this means has an iron content of about 30 per cent., and it is particularly suitable for the steelmaking process employed in the great works that have been established on the spot.

As a matter of interest, it may be added that Stewarts and Lloyds are restoring the land disturbed in extracting the ore to agriculture where this can reasonably be

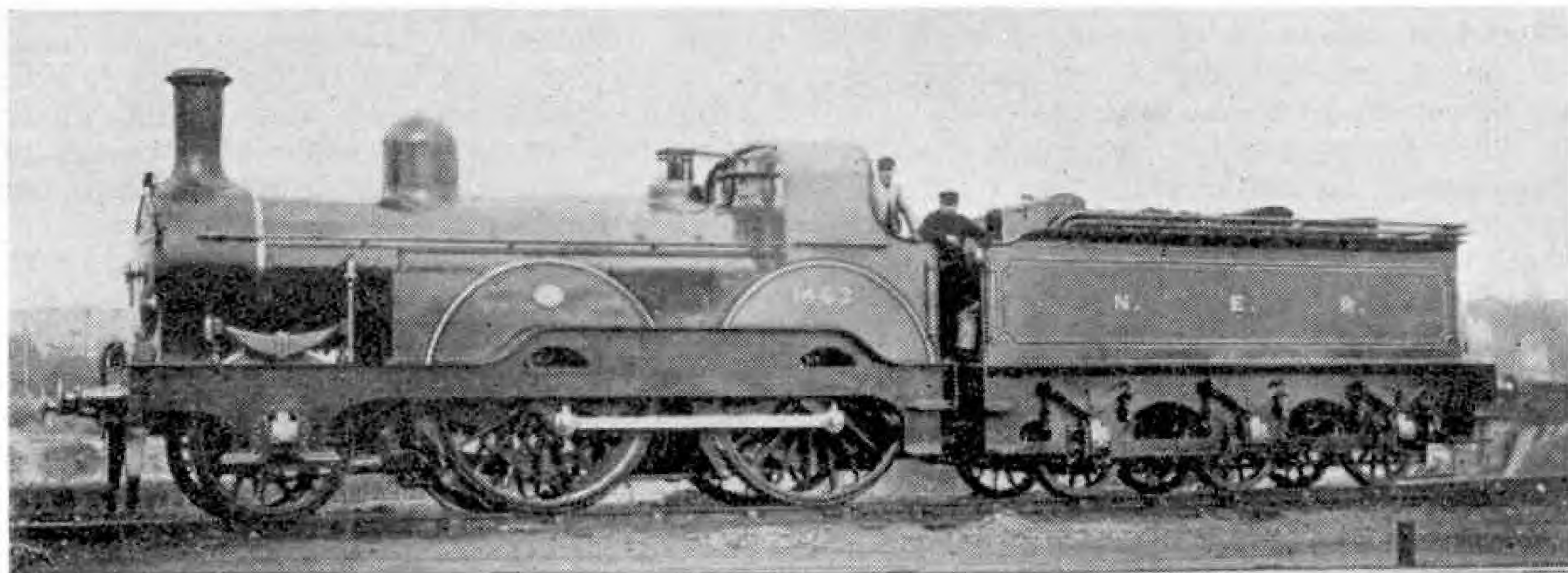
done. Where the overburden is too deep to allow this, the land is normally left in hill and dale formation, and in these cases trees are being planted. The company now has more than 800 acres of afforested land in the neighbourhood of Corby.

How steel strip is transformed into welded tubes of various diameters was the subject of another article in the *M.M.*, in June of last year, but it is a long way from ironstone dug out of the ground to finished steel tubes. The ore must first be crushed and fed into one of the blast furnaces along with coke, which actually is made at the Corby Works. This is done in a gigantic coke oven plant that can produce 12,400 tons of coke per week and which also yields gas, ammoniacal liquor



and tar. The ammonia is recovered as ammonium sulphate, for use as a fertiliser, and the gas from both blast furnaces and the coke ovens is distributed round the entire works by mains up to 7 ft. in diameter, so that it can be used as fuel. The tar and heavy fuel oil are used as auxiliary fuels, and the Works are operated entirely without the use of coal except that charged to the coke ovens.

The iron from the blast furnaces is first treated to remove much of the sulphur and is then converted into steel in Bessemer converters lined with dolomite, in which the change from iron to steel is brought about by blowing air through the molten metal. In addition to the Bessemer plant, in which there are five converters each of 25 tons capacity, (Continued on page 358)



Centenary of the N.E.R.

System that Included Britain's Pioneer Railway

By R. A. H. Weight

TODAY on British Railways the initials N.E.R. indicate North Eastern Region. For nearly 70 years between 1854 and 1922 they stood for North Eastern Railway, one of the largest of the old separate companies. This did not operate from London, but in many ways was a great railway. It was incorporated in July, 1854, a hundred years ago, as an amalgamation of some early lines known as the York, Newcastle and Berwick, the York and North Midland and the Leeds Northern. Each of these had helped to provide the first rail connections between the South, the Midlands and the North East of England. Soon afterwards the North Eastern incorporated that world-pioneer small system, the Stockton and Darlington, and the first important east to west cross-country line, the Newcastle and Carlisle. Thus its extensive area covered Yorkshire, Durham and Northumberland, with outposts extending over the fells into Westmorland and Cumberland.

As the N.E.R. served so much territory, containing many important mills, factories, mines, shipyards and docks, its freight and mineral traffic was enormous when I first knew it as a visitor from the south, just over 40 years ago. Indeed the tonnage of coal and minerals it handled then was greater than that of any other British railway, and it was the largest dock owning railway company in the Kingdom. Passenger traffic of the business, holiday and residential types also was efficiently carried on a large scale, earning nearly

£4 million in 1913 compared with over £7 million receipts from the Goods Departments.

The North Eastern was the central partner in the triple alliance of companies operating the East Coast route between England and Scotland. Its metals joined those of the Great Northern, a few miles north of Doncaster, so connecting to Doncaster and King's Cross, and those of the North British Railway near the Royal Border Bridge over the Tweed at

Berwick, thus giving access to Edinburgh. For many years, as a matter of working convenience, North Eastern locomotives ran through to Edinburgh

in the north, and also to Doncaster in the south. Similarly, Great Northern engines and crews ran through to York, where the great N.E.R. station, which I described in an article last year, received in the old days the variously coloured locomotives and rolling stock of several different companies now forming part of the Eastern or London Midland Regions.

N.E.R. territory visible from the trains includes some of the grandest inland and coastal scenery of northern England, as well as grimy but most important industrial areas. There are great cathedrals and other historic buildings, and famous bridges and viaducts. Steep gradients and sharp curves contrast with the straight and almost level main line between York and Darlington, the famous racing track along which in the southbound direction the N.E.R. used to run what was proudly

Tennant 2-4-0 locomotive No. 1463, the first of its class, designed by a committee and completed in 1885. British Railways Official Photograph.

announced as "The fastest train in the British Isles." This covered 44.1 miles start to stop in 43 minutes. Today there are quicker schedules still along that splendid stretch of track.

The North Eastern passenger rolling stock was painted crimson lake, a shade of red; the clerestory-roofed coaches were a feature for many years, and are well depicted in two of the illustrations. For through express services between Scarborough and King's Cross in summer, and for the regular express trains from Leeds or York to the north, there were fine corridor carriages with deep windows, some with centre gangways and tables, finished in varnished lake and lettered N.E.R., with coat of arms. Much of the East Coast rolling stock too was built in N.E.R. shops. This was finished in G.N.R. style varnished teak, fitted with both Westinghouse and vacuum brakes, the North Eastern and North British using the former and the Great Northern the latter.

The Editor summarised the first N.E.R.'s

those designed for heavy work, though with inside link-motion valve gear. Piston valves were general with superheating, even on many of the quite elderly locomotives, the large scale employment of the compound principle of using steam first in high and then in low pressure cylinders being gradually supplanted.

Of passenger engines the N.E.R. 4-4-0s built in the 1890's had many fine performances to their credit. They had driving wheels just over 7 ft. in diameter, and two turned out in 1896 had wheels of 7 ft. 7½ in. diameter, the largest ever used for English coupled wheels. The

6 ft. 10 in. R class which followed was used for the 43 min. Darlington-York run and much other express work. Some of these engines

are still working. They are known as the D20 class, though shorn of their one-time polished metal embellishments. The true glory of N.E.R. days is exemplified by the appearance of No. 1621, of 1895 railway racing fame, and other old engines from the same ownership seen in the Railway

One of the graceful 4-2-2 "singles" of a N.E.R. type extinct by 1921, photographed at Gateshead in 1893. Photograph by courtesy of J. W. Armstrong.

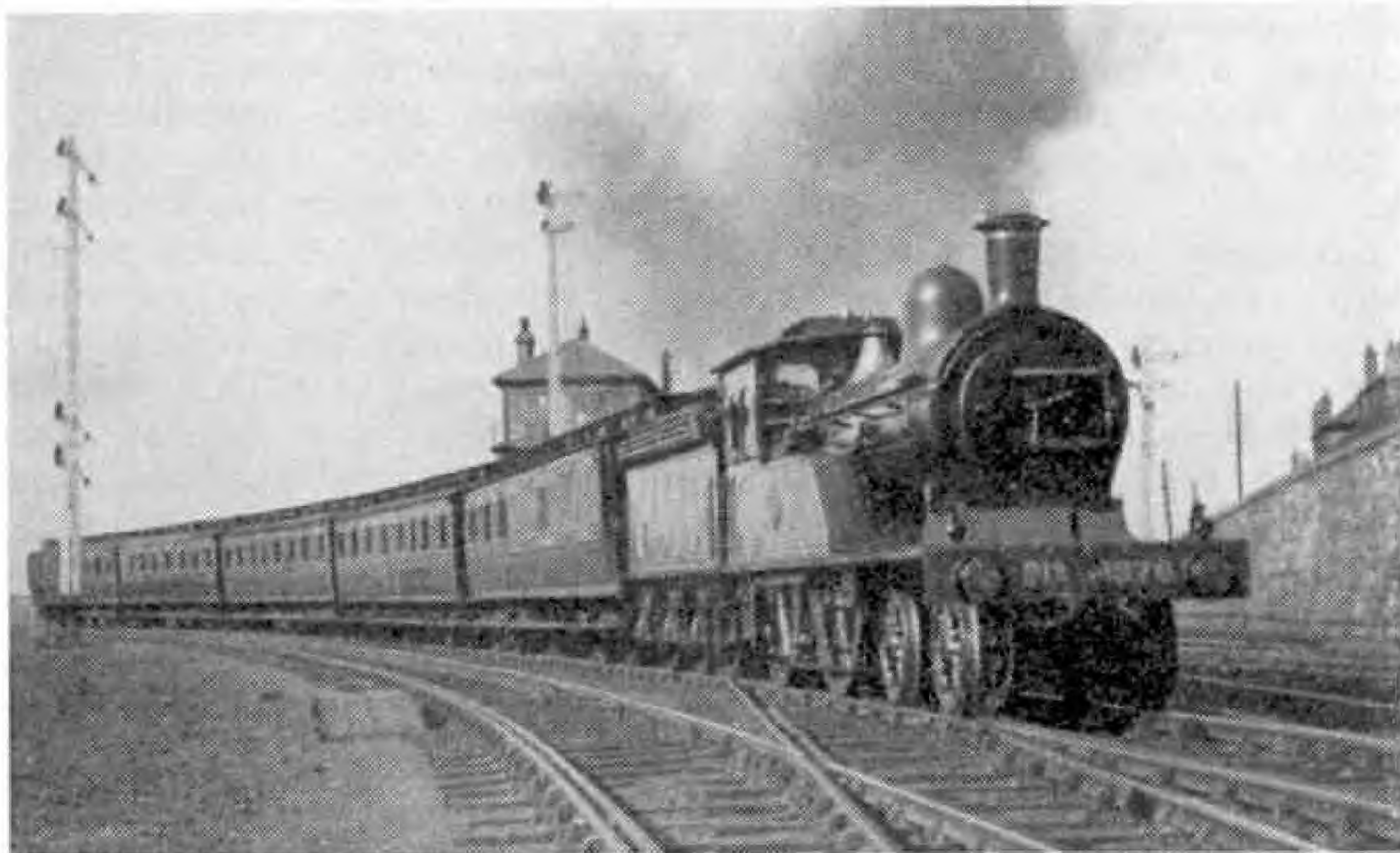


locomotive history briefly in the May issue. To me, during the final decade before the system was merged into the L.N.E.R. in 1923, it was a big engine line! There were so many different types, including large modern machines, some of which are at work today, in classes B16, Q6-7, J27, A8 (rebuilt) and T1 tanks for example.

The vast amount of freight traffic called for stocks of powerful 0-6-0 and 0-8-0 engines, as well as 4-6-0 mixed traffic locomotives, becoming gradually larger and more powerful. In Sir Vincent Raven's time as Chief Mechanical Engineer, from 1910 to 1923, three-cylinder propulsion was favoured for the principal types and

Museum at York. The passenger engine colour was a rather light green.

Until its absorption into the L.N.E.R. group, the North Eastern issued on application a first class season ticket available over its whole system for a week at a modest cost of a few pounds. Armed with one of these in 1922, the last year this was possible, I spent a most instructive and interesting week travelling from York to Leeds, Normanton, Hull, Scarborough, Whitby, Harrogate, Darlington and other places. Then I transferred my headquarters to the company's hotel at Newcastle, and visited Berwick-on-Tweed, Kelso, just in Scotland, the industrial north-east coast and port area, Carlisle, Kirkby Stephen



A typical scene at King Edward Bridge Junction, south of Newcastle, showing a polished Q 4-4-0 on a southbound express about 40 years ago. Photograph by R. J. Purves.

in Westmorland, Whitley Bay and Cullercoats, thus sampling the electric suburban services round Newcastle-upon-Tyne. In contrast to the large Atlantics and R1 class big 4-4-0s, I saw or travelled behind some quite different and much older and smaller locomotives.

Loudly vocal 2-4-0s built in 1885 or earlier, hauling trains I was in, stormed over the steep gradients between Bridlington and Filey near Flamborough Head on the Yorkshire coast, and also up to that tremendous summit 1,378 ft. above sea level amid the Pennines on the cross-country line to Tebay or Penrith. On the return journey a Fletcher 6 ft. 1 in. 2-4-0 of 1880 vintage touched 70 m.p.h. downhill.

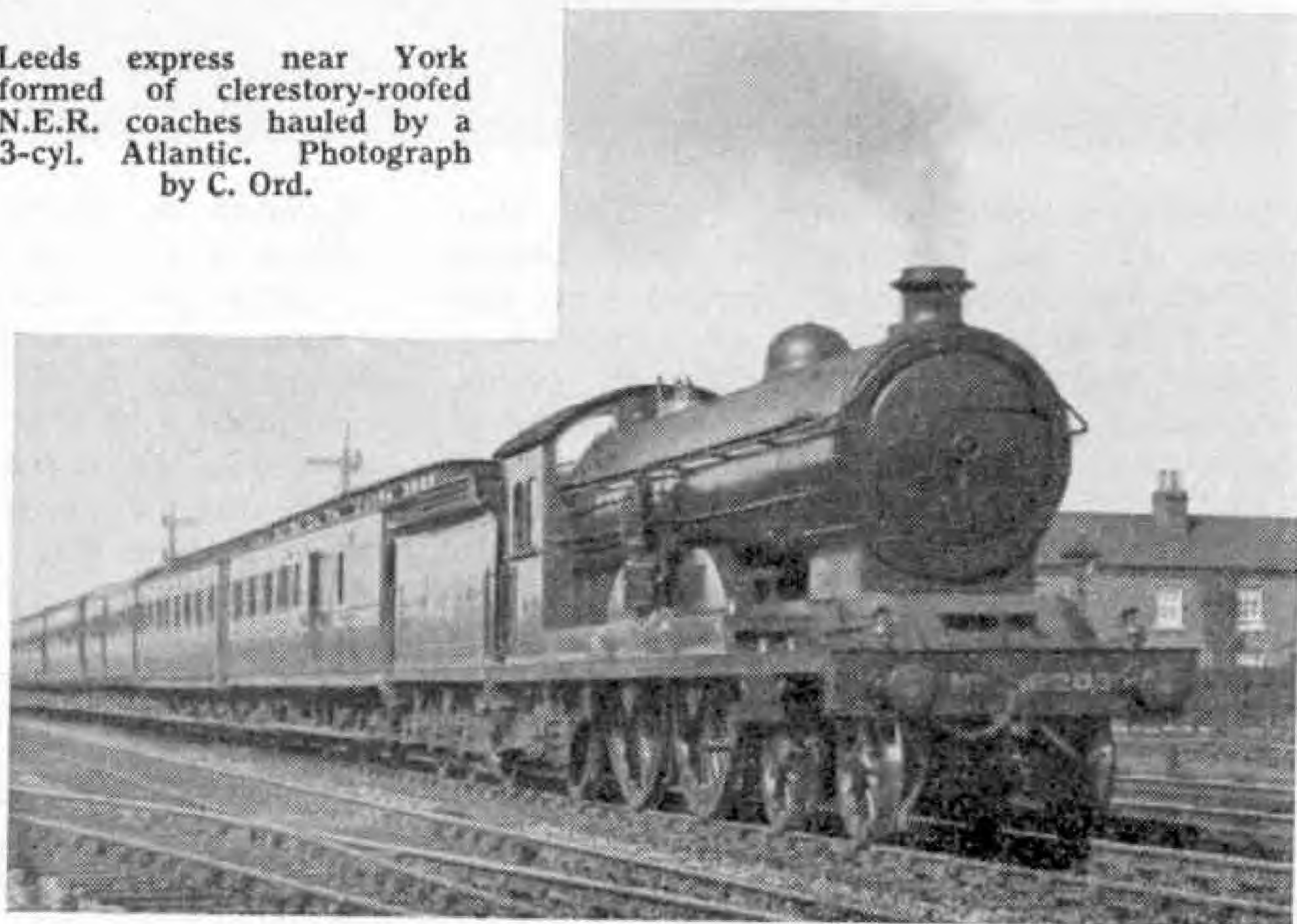
I also went over the Goathland and Pickering moorlands behind one of the famous and still useful 0-4-4Ts, now the G5 class, and on the Forge Valley train headed by a Fletcher well tank used for push-and-pull working. Many of these engines were converted to class J77 0-6-0Ts, after a long life, and one I saw, on a light local turn, rebuilt as one of the rather extraordinary 2-2-4Ts. This was No. 957, smartly turned out something like the famous and ancient *Aerolite* still

on view at York.

There were constant comings and goings with loaded and empty mineral, iron ore and freight trains to and from the industrial districts. Express fish trains ran from Hull or through from the north, many of which were handed over to the Great Northern, the Great Central or other companies when destined further south. The old North Eastern company operated dock installations at Hull, Hartlepool, Middlesbrough and on the Tyne, and the busy coal shipping staiths at Blyth and Dunston-on-Tyne. It also exercised a part interest in various Continental shipping services.

Many of N.E.R. country stations were gay with flowers and a number of the important town ones much smartened up as was the track and lineside maintenance, during the closing years of the railway as I knew it. A high standard was sustained after the great system was merged into the L.N.E.R. when the Gresley designs of locomotives and rolling stock gradually became much more (Continued on page 358)

Leeds express near York formed of clerestory-roofed N.E.R. coaches hauled by a 3-cyl. Atlantic. Photograph by C. Ord.



In the picture on the right the new Salter crane weigher is seen weighing a heavy casting at the works in Sheffield of the English Steel Co. Ltd., for whom it was made. With it weighing and lifting are carried out in a single operation.

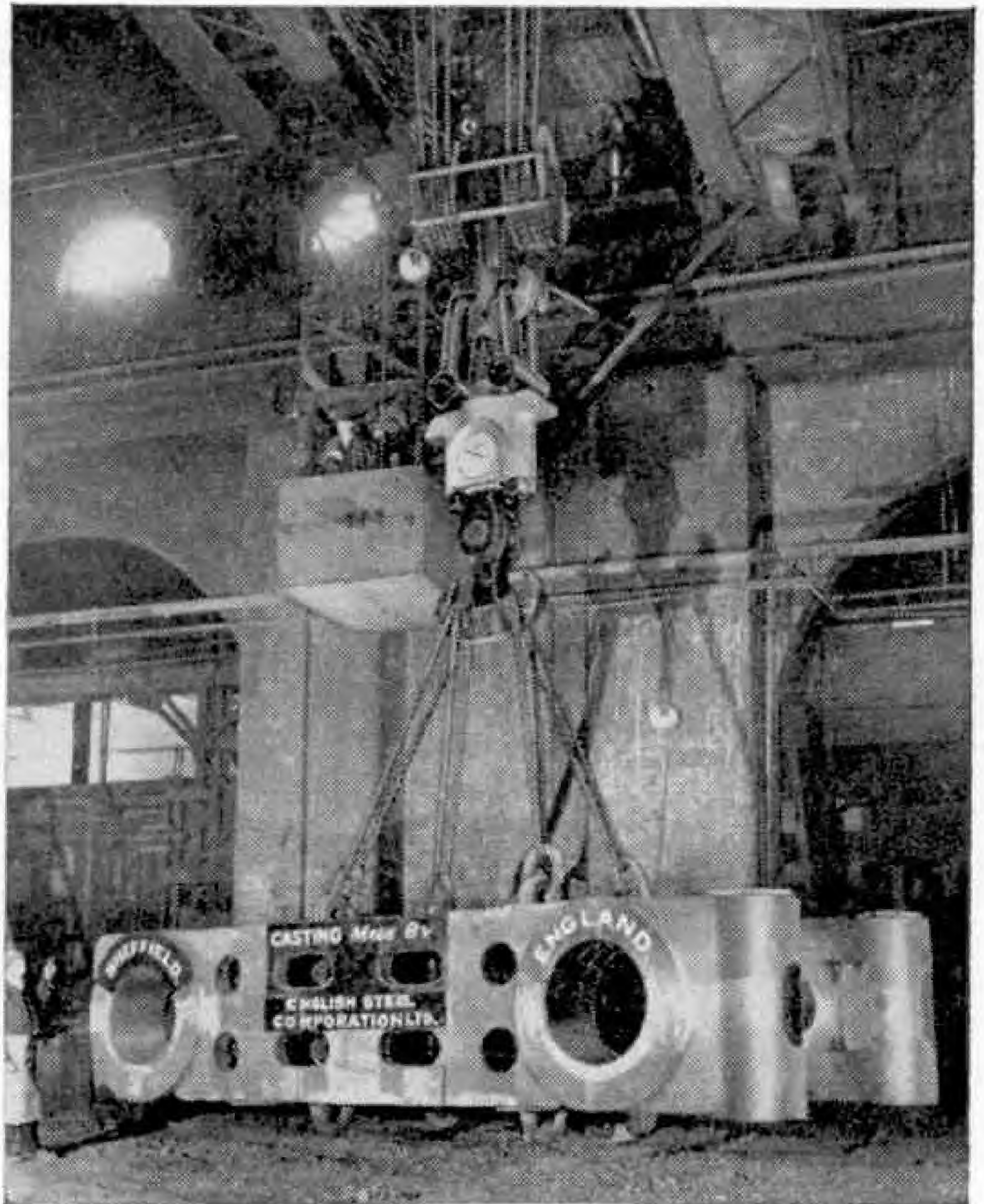
DURING the 194 years of its existence the West Bromwich firm of Geo. Salter and Co. Ltd. has produced springs and spring balances for an astonishing diversity of purposes. Now the Salter company has produced for the English Steel Co. Ltd., of Sheffield, an instrument that fully justifies the description "the largest capacity spring balance in the world."

The balance, which itself weighs more than six tons, is designed to handle weights up to 200 tons, and is an outsize development of the firm's already well-known crane weigher—an instrument that when attached to a crane allows lifting and weighing to be carried out in a single operation. Salter crane weighers are available in many different capacities from 10 cwt. upwards, but previously the greatest capacity provided for was 120 tons.

The 200-ton weigher is an impressive instrument. In its normal vertical working position it measures 12 ft. from the base of its ram's horn hook to the top of the two shackles from which it is suspended while in operation.

The hook alone weighs approximately $1\frac{1}{2}$ tons, and as a further indication of its great size and massive construction the weight of the two shackling pins for the loops and the one for the hook totals $8\frac{1}{4}$ cwt. Despite its weight and size, however, the machine is in every sense a precision instrument. It has been officially tested for accuracy, and stamped by an Inspector of Weights and Measures.

The spring resistant of the Crane Weigher is unique. In fact two Belleville Washers or disc springs are used, opposed to each other as concave surfaces. The middlepiece passes through each washer at its centre and is held by a nut at the top end. To the bottom end of the



middlepiece is attached the actual load hook, so that when a load is applied, both hook and middlepiece are drawn downward and compress the washers together against the top of the case of the weigher.

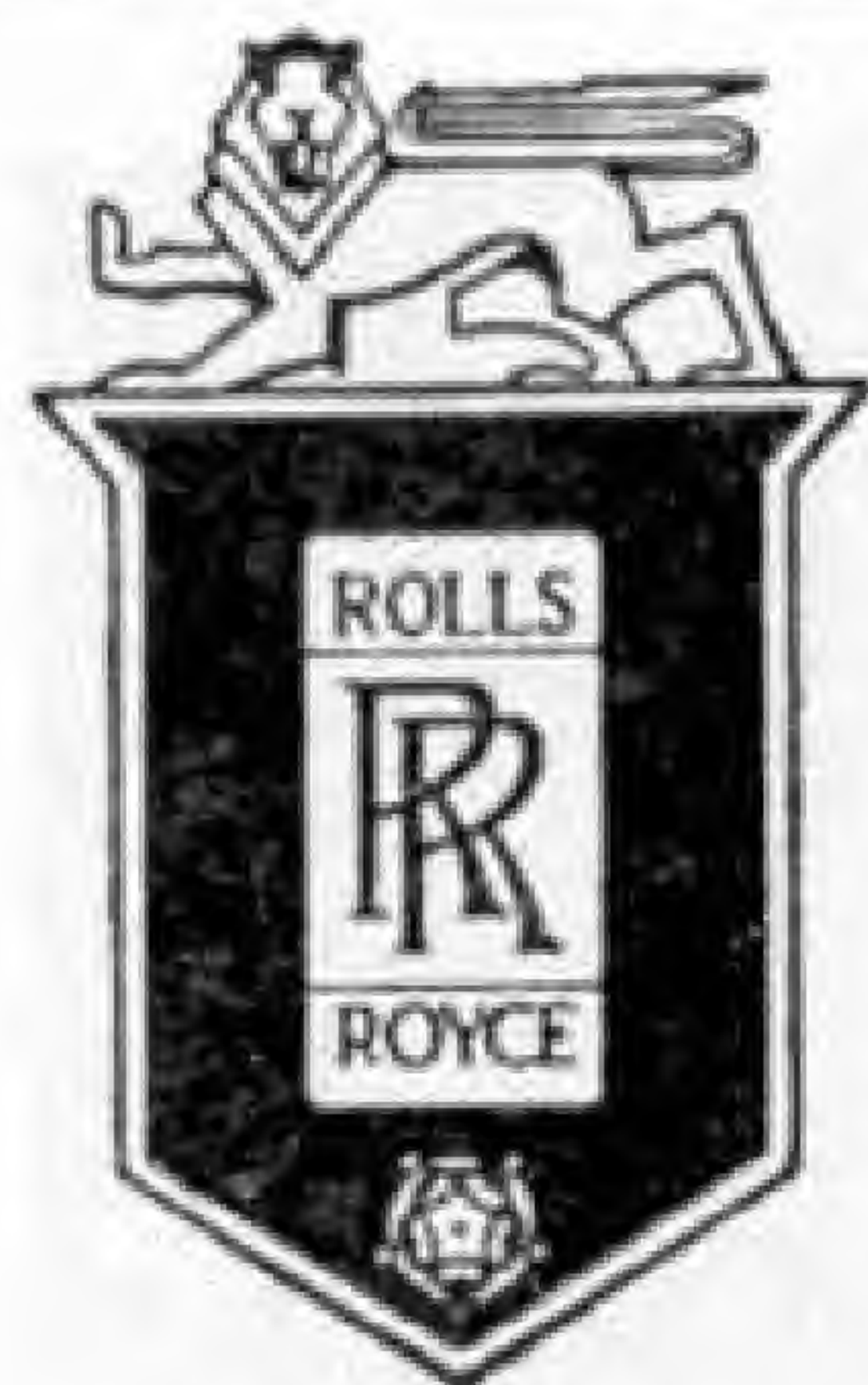
It is interesting to note that the actual movement of the load is never more than $\frac{1}{8}$ " even under full load, this being converted

by quadrant and pinion into the rotary movement of a pointer around the dial. The dial is marked to

Spring Balance that Weighs up to 200 Tons

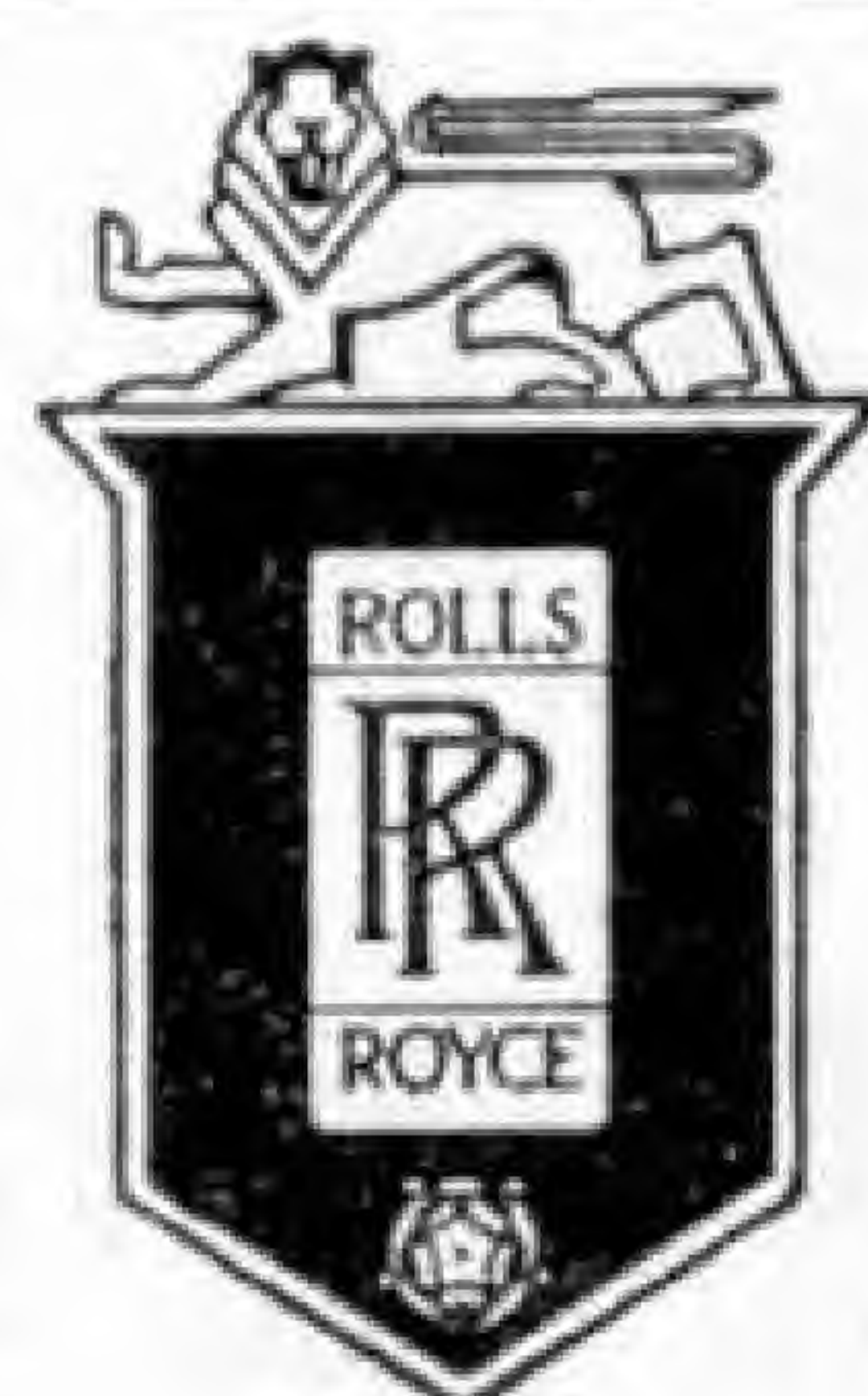
200 tons with 1-ton subdivisions.

After overload tests at Lloyds Proving House at Netherton, when it withstood a 300-ton load with no sign of weakness or distortion, the machine was taken to the University of Birmingham's Department of Civil Engineering for calibration. There, on the University's 300-ton tensile testing machine, a full load of just over 200 tons was applied, after which calibration of the dial began, load readings on the steel yard of the testing machine being marked on the dial of the crane weigher.



The Story Behind the Badge

By John W. R. Taylor



HOW does one begin to tell the story of Rolls-Royce? It would be easy enough to describe the beauty and elegance of Rolls-Royce motor cars; or the achievements of four decades of aircraft powered by Rolls-Royce aero engines. But that would be only half a story, for the name of Rolls-Royce has become a symbol of excellence throughout the world, a yardstick by which the quality of other firms' products is measured. Bicycles, perambulators, gramophones, cigarettes — even cows! — have been proclaimed proudly as the Rolls-Royce of their kind, implying quite definitely that they are second-to-none.

Such a reputation is not, of course, earned easily; but in this case it *was* earned very quickly. Right from the start, Rolls-Royce motor cars established standards of design, manufacture and performance that were little short of miraculous for that age.

One of these very early Rolls-Royces — a Silver Ghost built in 1907 — is still in existence and has, in fact, spent much of its time during the last year or two in the company's London showrooms in Conduit Street. Some of you have probably seen it there and, if so, I do not need to tell you that this 47 year old veteran holds its own quite happily with the sleek Silver Wraith and Silver Dawn saloons of today. Its coachwork and finish are impeccable; its hand-made silver lamps shine like new; and the quality of its 40/50 h.p. six-cylinder engine was proved during a journey from

the Rolls-Royce factory at Derby to London, when it passed scores of present-day cars at a comfortable 60 m.p.h.

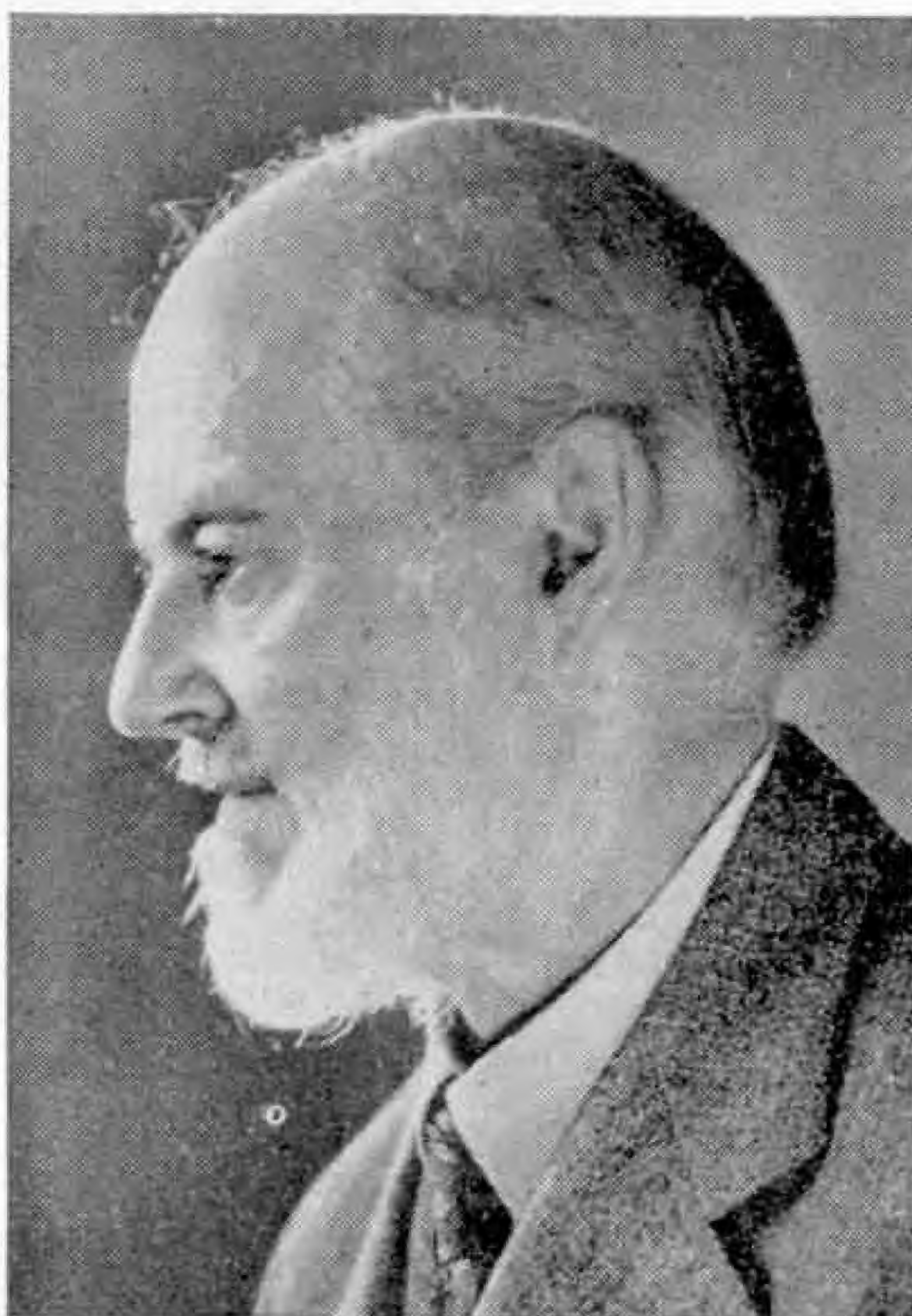
To understand why and how this tradition of excellence came about we need look no further than the famous trademark itself; for it is made up of the names of two

remarkable men — the Hon. Charles Stewart Rolls and Mr. (later Sir) Henry Royce. Their first meeting in Manchester just fifty years ago changed the pattern of history, for without aero engines designed and built by the company they formed, Alcock and Brown's Vickers Vimy would not have flown the Atlantic in 1919; Britain would not have won the Schneider Trophy in 1931; Hurricanes and Spitfires would not have smashed the *Luftwaffe* from the skies over Southern England in the Battle of Britain; and Bomber Command's Lancasters and Mosquitoes would not have been able to

strike back at the heart of Hitler's Fortress Europe.

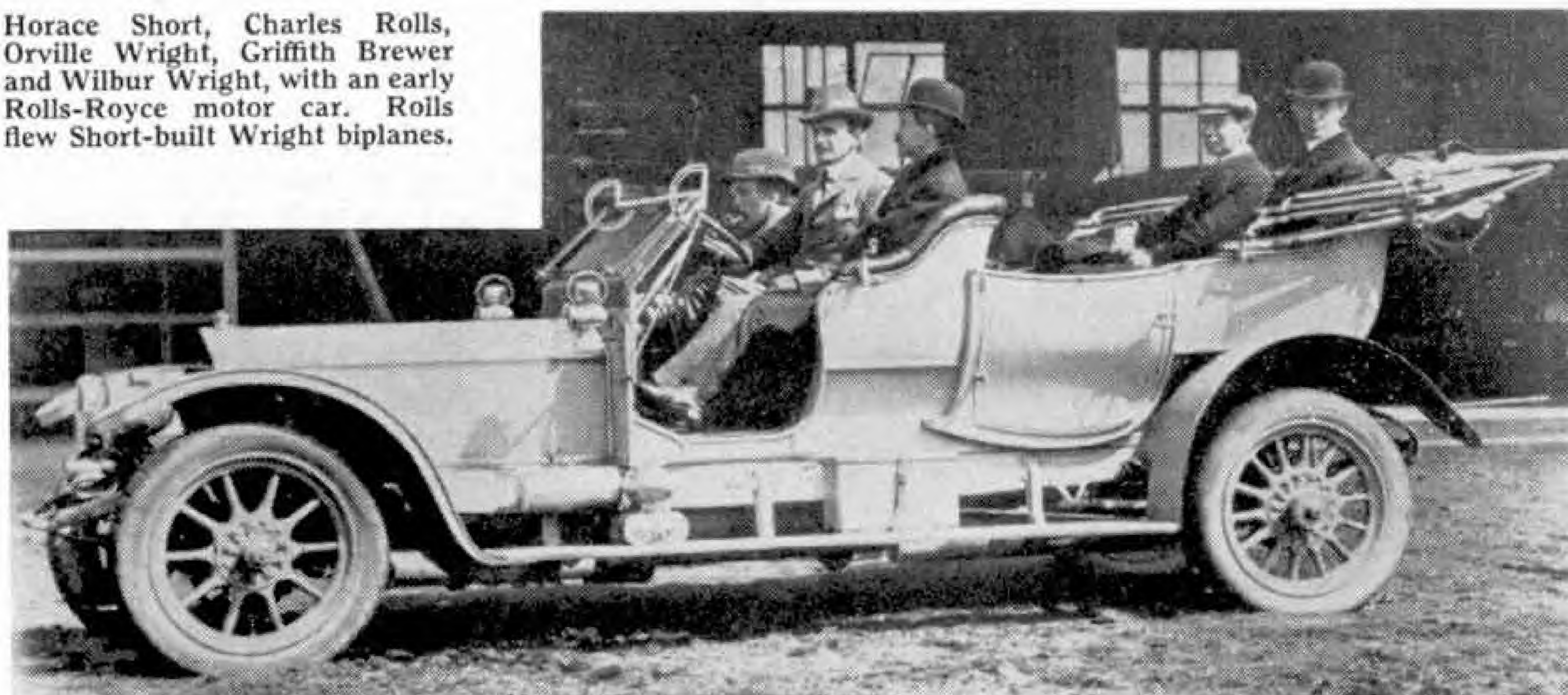
Yet these two men had little in common, except their passion for mechanical and electrical perfection. Henry Royce was an engineer who came up the hard way, helping to support his family from the age of ten. He worked, studied and starved — sometimes all at the same time — until he had accumulated knowledge and a rare genius for improving existing machines and electrical instruments.

Hard work brought its reward and he was quite a prosperous manufacturer of dynamos and electric cranes when, in 1903, he



Sir Henry Royce.

Horace Short, Charles Rolls, Orville Wright, Griffith Brewer and Wilbur Wright, with an early Rolls-Royce motor car. Rolls flew Short-built Wright biplanes.



bought a second-hand French motor car. Typical of its day, it was noisy, unreliable, crude and inefficient. Royce was appalled and, inevitably, decided to do something about it.

Although he knew little about cars, he at once set to work building three 10 h.p. two-cylinder cars in his dynamo and crane factory in Cooke Street, Manchester. He did much of the precision work himself; the rest was done by hand-picked mechanics and apprentices, and the first car was finished on 1st April, 1904. Despite the date, it started at the first pull on the handle—an unprecedented occurrence at that time.

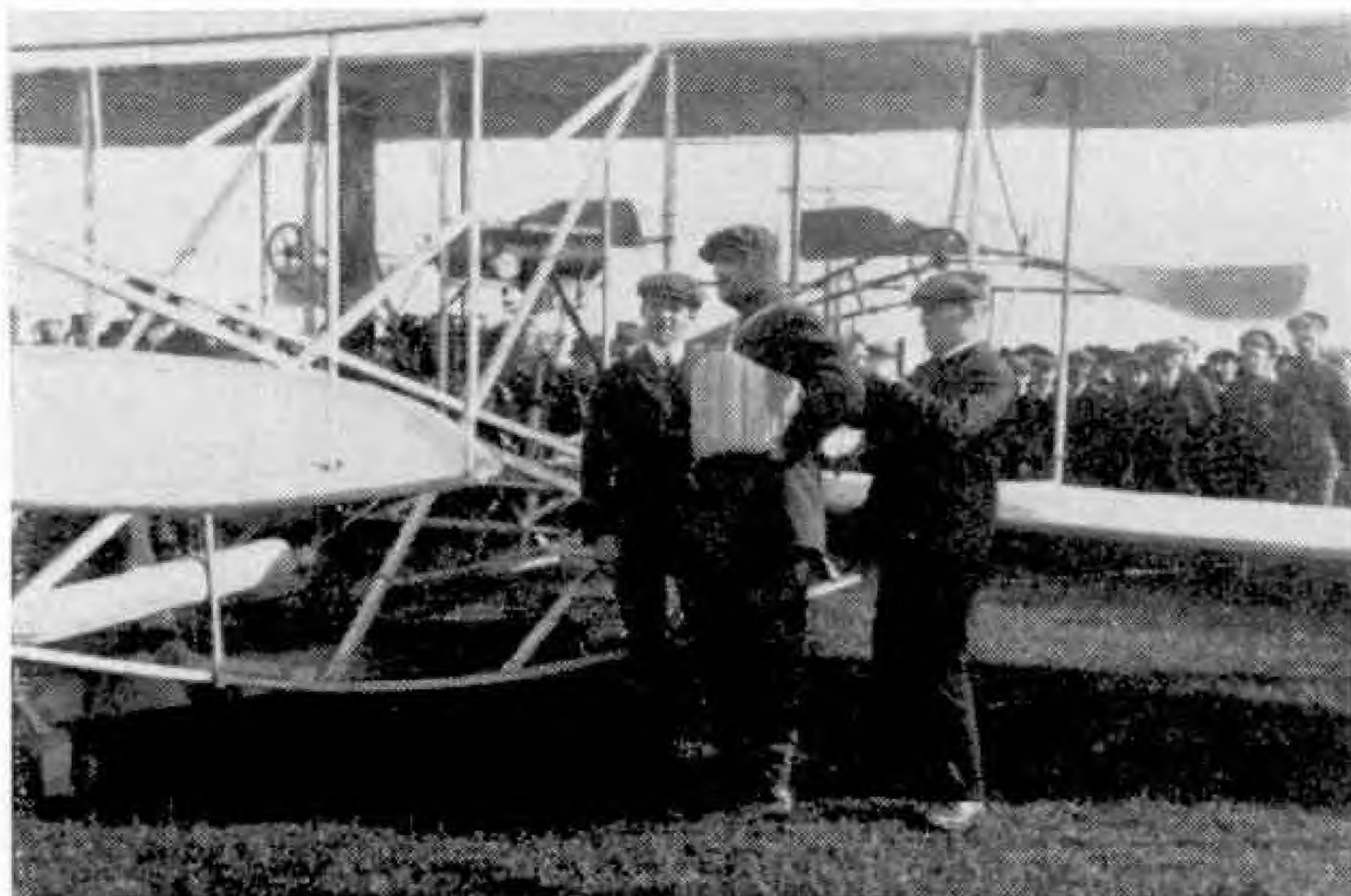
Meanwhile Charles Rolls was despairing of ever finding a good British car, and nobody was better qualified to judge them. Born the third son of Lord Llangattock and educated at Eton and Cambridge, he could have lived a life of leisure, for his family

owned a large estate in Monmouthshire, a town house and an ocean-going yacht. But that would never have satisfied his adventurous spirit and, instead, after taking a degree in Mechanics and Applied Science, he quickly became one of the most daring and knowledgeable of our pioneer motorists.

His enthusiasm had first been fired in 1894 when, at the age of 17, he travelled to France with his father. Instead of England, where a few "horseless carriages" crawled along the highways at four miles an hour, he found himself in a country where motor cars had developed rapidly in the absence of speed limits and the hostility of police and magistrates.

He brought a 3½ h.p. Peugeot back to England, and later turned to racing and records. In 1897 he drove a Daimler from John O'Groats to Land's End in seven days; three years later he won the first Thousand Miles Reliability Trial in a 12 h.p. Panhard; and in 1903 set up a world speed record of 93 m.p.h. in a 70 h.p. Mors.

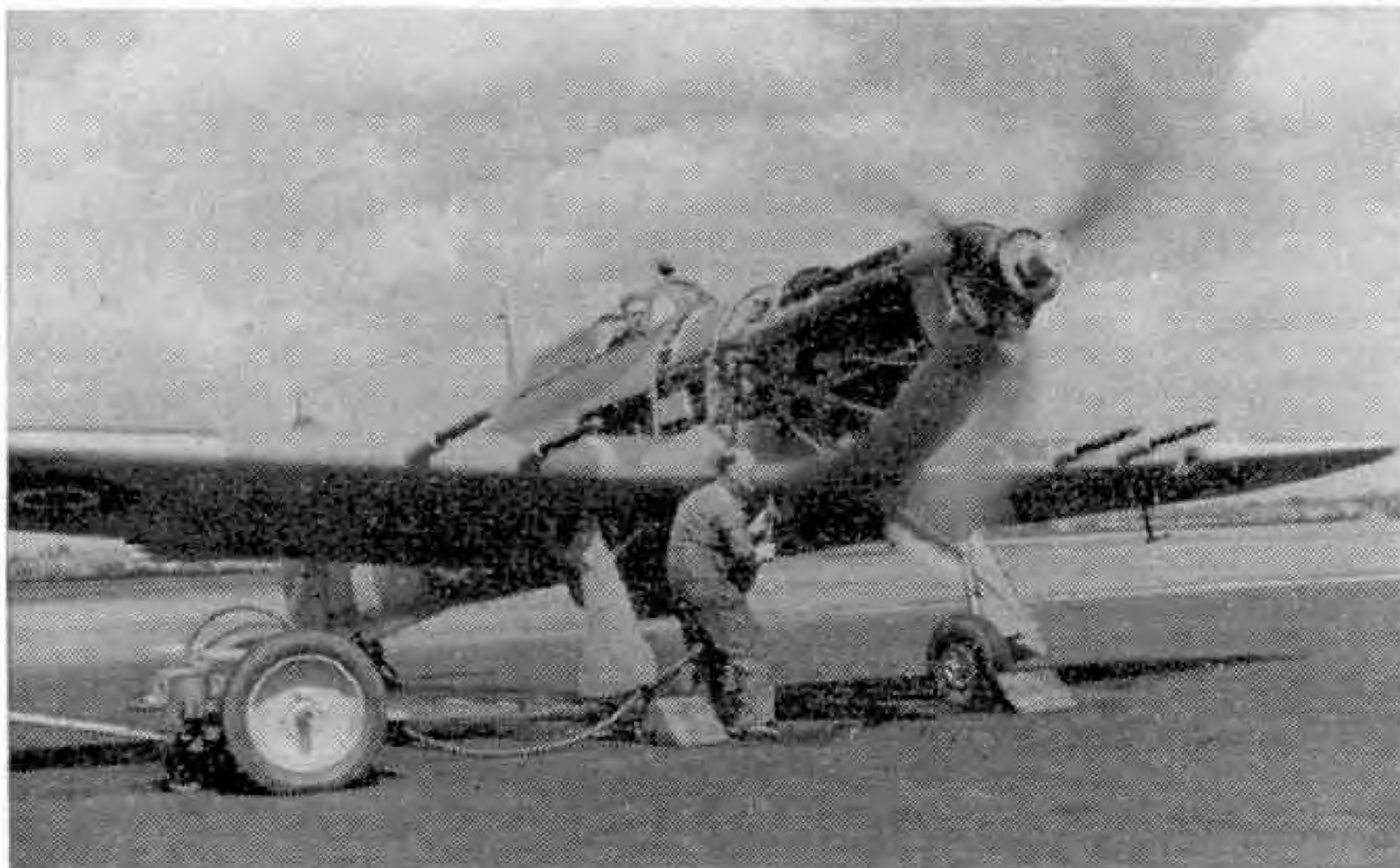
Turning his experience to practical ends, with the aid of an organising genius named Claude Johnson, he set up in business as C. S. Rolls and Co. in 1902, to sell the best Continental cars. Within two years he was the leading motor salesman in the country,



Two-way Channel flight from Dover, 2nd June 1910. C. S. Rolls having his lifebelt fitted for the flight.

with orders for more than 100 cars, none of them British. Then one day a friend named Henry Edmunds told him about a car he had just bought—one of three made by a man named Royce. He suggested quite casually that Rolls might like to meet Royce—and from that simple suggestion came the most renowned engineering concern in the world.

First test run-up of a Rolls-Royce Merlin engine in a Hurricane IIc fighter, straight off the wartime assembly lines at Hawker's Langley, Bucks, factory.



The two men took to each other at once. Rolls saw one of Royce's little cars, tried it for himself and offered to sell all the cars the latter could build. He sent one to France, where it won a diploma and gold medal at the Paris Salon.

Nearer home, the wealthy aristocracy of Edwardian England were beginning to turn slowly from horses to horse-power; and they wanted reliability, comfort and silence, not adventure and uncertainty. The new association of Rolls-Royce set out to meet their requirements; but such men obviously could not be content for long with a 10 h.p. car. In the spring of 1905, they put 15 h.p. three-cylinder and 20 h.p. four-cylinder models on the market, followed in a few months by a 30 h.p. car with its six cylinders arranged in three separate blocks of two.

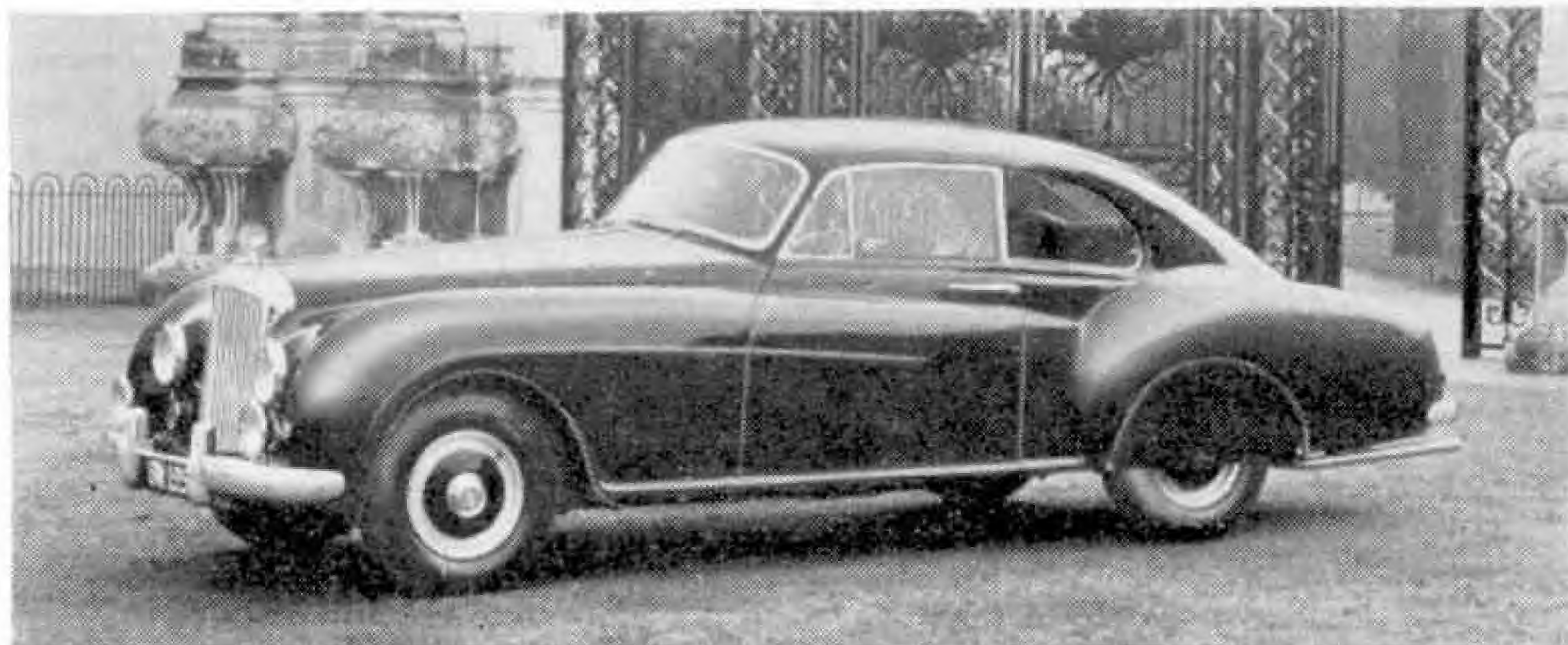
"Rolls-Royce Limited" came into being in 1906, and soon afterwards Rolls won

the Isle of Man T.T. race, driving one of the company's 20 h.p. cars; after which he took it to New York and won the five-mile race at the Empire City Track. Meanwhile, Royce was working on their masterpiece—the Silver Ghost—which was destined

to earn for the Rolls-Royce the simple slogan of "the best car in the world".

It set a standard of excellence for the company's cars that has remained to the present day, even though the two men whose genius created it have long since passed away. Rolls was first. He could hardly be expected to shackle himself to even the fastest, finest car once Man had learned to fly. Already a keen balloonist, he flew with the Wright brothers on one of their primitive aeroplanes and soon became one of Britain's foremost pilots, taking his Certificate, No. 2, half an hour after Lord Brabazon had taken his No. 1. In June 1910 he was the first man to fly the English Channel in both directions. Five weeks later, at the age of 33, he was the first Englishman to die in an aeroplane crash.

Royce carried on, despite bad health that forced him to work away from his new factory at



The Bentley Continental Sports Saloon. Coachwork by H. J. Mulliner and Co. Ltd.

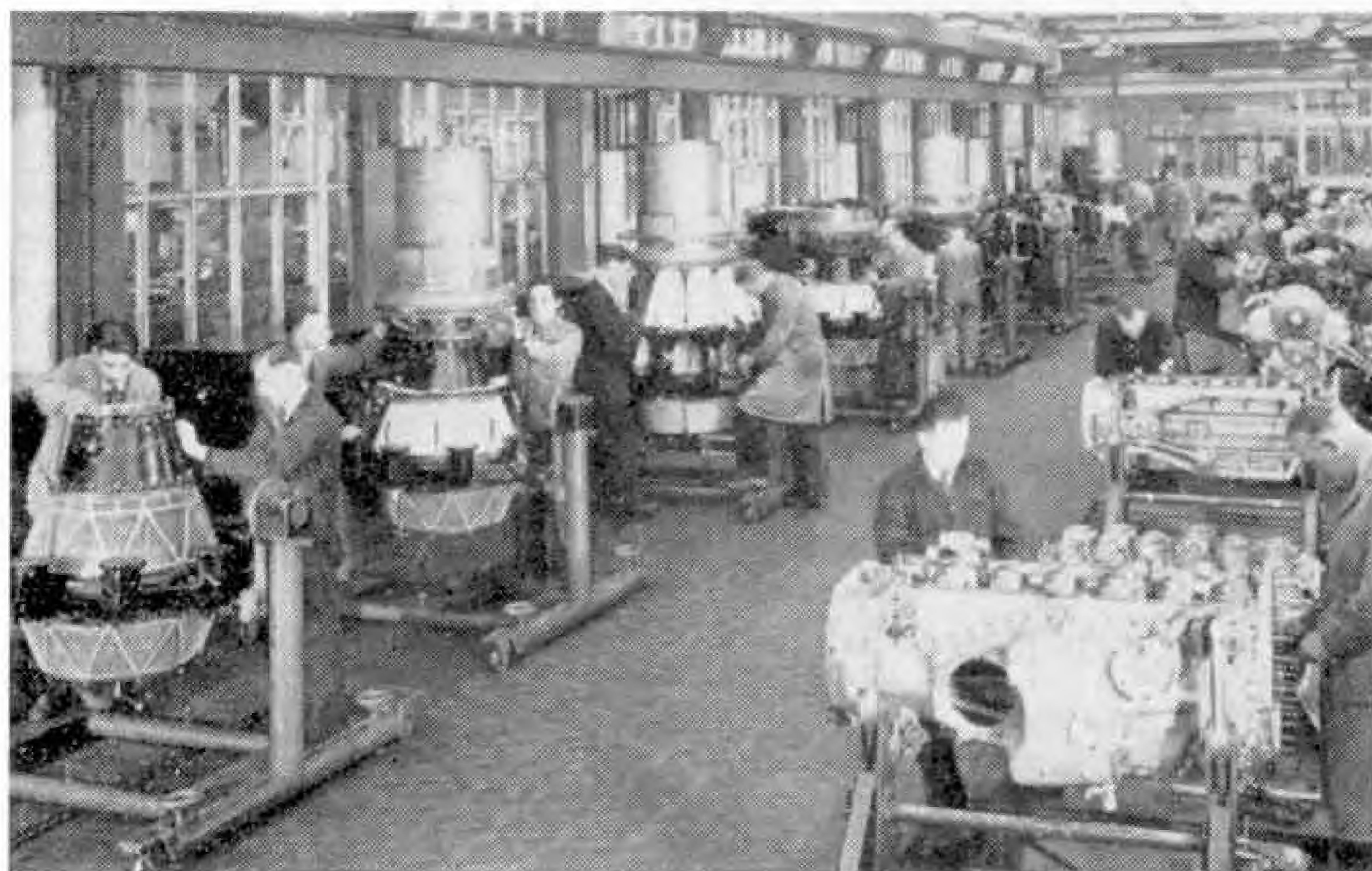
Derby, which he was never to see again. On the outbreak of war in 1914, all the chassis in the works were commandeered, and Rolls-Royce staff cars, ambulances and armoured cars put in yeoman service in every battle zone during the next four years. Derby, empty of cars, became the home of a great new industry.

Henry Royce himself designed the first Rolls-Royce aero engine. Every one of its 2,000 parts was hand-built, examined and tested before assembly, for he was determined to produce no less than 200 h.p. from an engine weighing only 900 lb. At last, in 1915, came the day when it was ready for test—a water-cooled engine with two banks of six cylinders arranged as a V. As with the little 10 h.p.

development continued too, and 1925 saw the first of the "F" series of engines (later named the Kestrel) which powered many of the great British warplanes of the '20s and '30s, including the Hawker Fury and Hart, Fairey Fox, Handley Page Heyford and Short Singapore flying boat.

Even more significant, in 1928 the Government asked the company to develop a racing engine, and the result was the fantastic Rolls-Royce "R", which gave 2,530 h.p. for a weight of only 1,630 lb. Mounted in a Supermarine seaplane designed by Mitchell, it not only won the Schneider Trophy outright for Britain and raised the World Speed Record to 407.5 m.p.h., but pointed the way to a later Mitchell-Rolls-Royce creation that helped

to save Britain in her darkest hour—the Spitfire, powered first by a Rolls-Royce Merlin and then by a Rolls-Royce Griffon engine. But Sir Henry Royce



Assembling Rolls-Royce jet engines at Derby.

car in 1904, the engine burst into life at the first touch of its starter. Royce got his 200 h.p., and more. In fact, by the end of the war, the same engine had been developed to give 360 h.p.

He decided to name his aero engines after birds of prey, so it was known as the Eagle, and altogether 4,674 were built. They powered many famous aircraft, including the Handley Page O/400 bomber, the F.2A flying boat and the Vickers Vimy bomber, one of which was first to fly the Atlantic non-stop in 1919. Equally famous was the Rolls-Royce Falcon, 2,185 of which were produced for the famous Bristol Fighter and other warplanes.

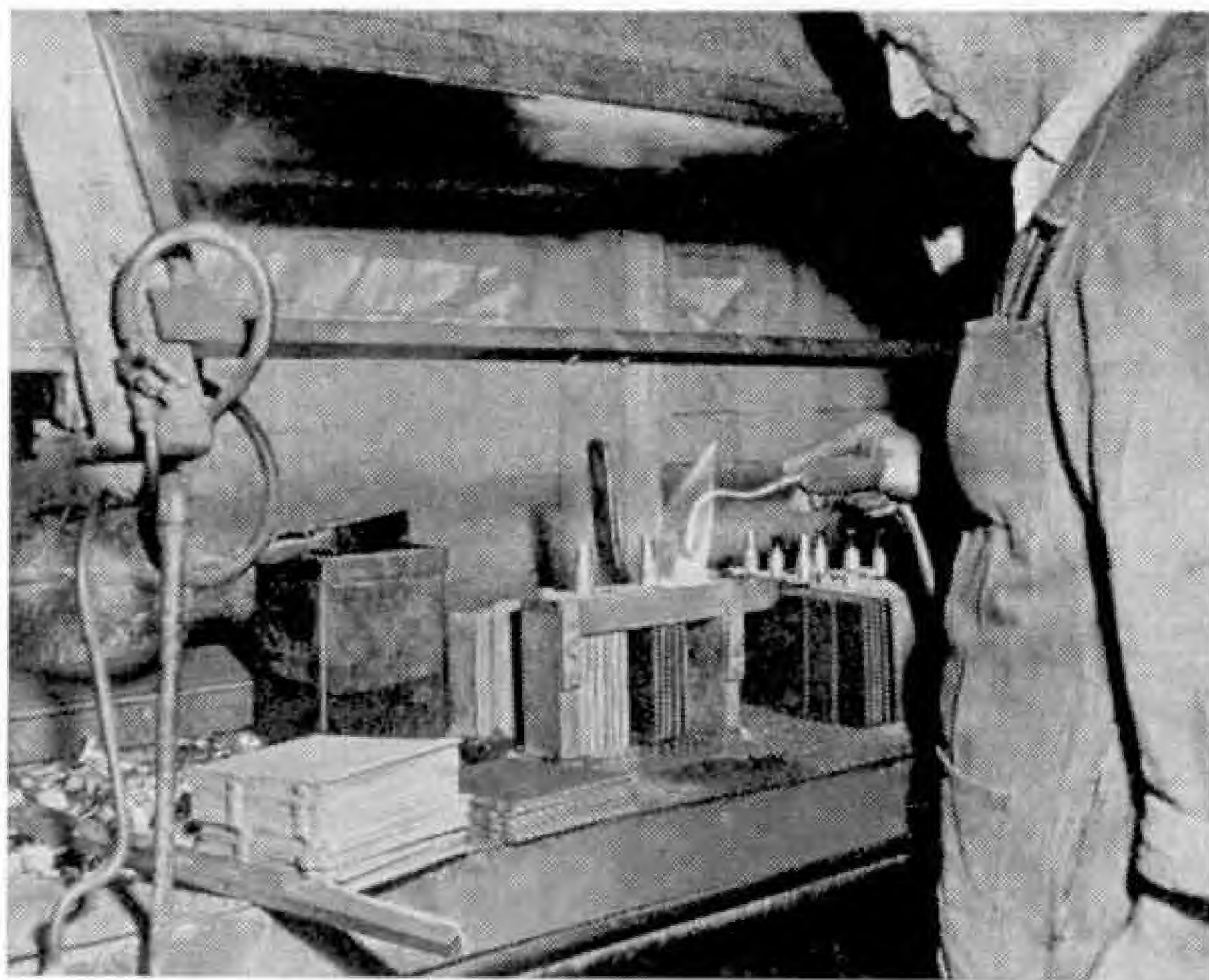
After the Armistice, the company returned to the manufacture of cars, and Royce himself was largely responsible for the design of the Phantom, which succeeded the Silver Ghost. But aero engine

did not live to see the Spitfire. He died in 1933, and in that year the colour of the initials R-R on the radiator badge of Rolls-Royce cars

was changed permanently from red to black in mourning for him.

The rest of the Rolls-Royce story is too fresh in our minds to need telling in detail. More than 150,000 Merlins were built in World War II, and they became the most widely-used power plants of the victorious Allied air forces. When Whittle produced his first successful jet engines, it was Rolls-Royce who developed them into the Welland and the Derwent to power the Meteor, the only Allied jet used in action in 1944-45.

Rolls-Royce cars, joined by the Bentley in 1931, are now made at Crewe; for Derby factory is devoted solely to aero engine design, development and manufacture. From its assembly shops have come the superb succession of Rolls-Royce turbojet and turboprop engines, named after British rivers, which have played a major part in giving Britain her leadership in the air,



"Burning" battery plates in a jig so that the plates are connected to the post by a lead strip. Our illustrations are reproduced by courtesy of Oldham and Son Ltd.

where batteries are made, would soon convince the most earnest sceptic that there's far more in the making of a battery than most people imagine. The first definite process takes place in the Casting Shop, where the grids are moulded. They are the basis for the positive and negative plates. These plates are the backbone of the modern battery, and the backbone of each plate is its grid—a criss-cross metal structure cast from an alloy consisting mainly of lead and

TO most of us the modern battery is nothing more or less than an ugly black box underneath the bonnet of the car. Most of us know that it is full of plates and sulphuric acid and that it seems to go on working without much attention. The first batteries, made many years ago, were rather crude affairs, but the battery of today is a highly scientific engineering product—the result of years of constant research and endeavour.

There are all sorts and sizes of batteries.

Batteries for cars, for buses and lorries, for ships, for jet aircraft, for miners' cap lamps,

for the marker buoys of fishermen's nets and for the emergency lighting circuits of hospital operating theatres. There seems to be practically no limit to industry's capacity for devising new uses for storage batteries, each of which must be specially made for its particular use.

One of the world's largest battery manufacturing firms today is Oldhams, which really started way back in 1865 as a one-man business. Today the factory at Denton employs some 1,200 men and women and there are associated companies in France, South Africa, Australia and India. Oldham products are today manufactured, under licence, in America, where they earn valuable dollars for Britain.

A day spent in the factory of Oldham and Son Ltd., at Denton, Manchester,

antimony, with other materials added as mere traces that have a far-reaching effect upon the strength of the plate and its ability to withstand corrosion. After considerable research in their laboratories Oldhams produced a new alloy known today as "X Metal". It is believed that this is the best so far produced anywhere during a century of battery making, giving the plates greater resistance to buckling, and conferring on the battery greater power and a far longer working life.

How Things are Made

The Modern Storage Battery

Two methods are used in casting grids at the Oldham Works.

Those for use in some types of batteries are cast by hand, but grids for the normal run of batteries are cast on automatic or semi-automatic machines. Automatic casting is being used to an increasing degree.

When first cast the grid looks very much what one would expect from its name. At one corner it has a lug, or ear, which is finally attached to the terminal or connector post. They are now stacked for ageing before passing to the next process of pasting. In the meantime the terminal and connector posts are being cast.

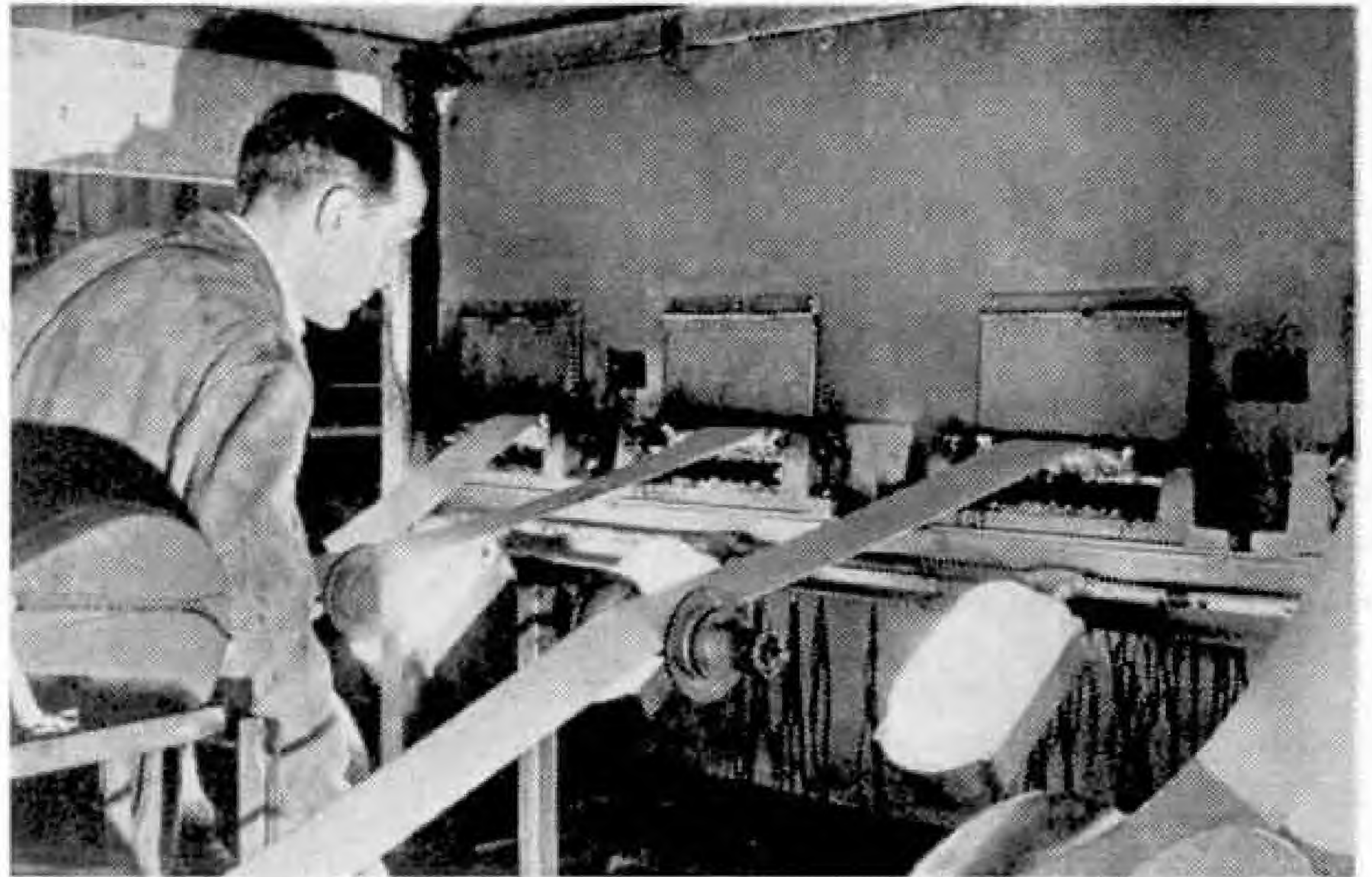
Meanwhile another and a vital process is taking place in a nearby shop. The plates have to be filled with lead oxide paste. Lead oxide is made by feeding lead in cubes of uniform size into an oxide

Examining Fibrak stock that has been impregnated with resin and dried over lights. This material is later ribbed and cut to form separators.

mill, which is a large heater drum that is constantly rotated. The temperature inside the drum is a critical factor in the correct manufacture of the oxide. At the required temperature the cubes disintegrate into a fine powder which is drawn off into hoppers. From these it is loaded into barrels and stored until needed for the next stage in the process—the making of the oxide paste.

The power of a battery depends to a great extent on the quality of the oxide used in making it, and it is intriguing to watch the paste being made. The process is, to say the least, dramatic. The operators wear thigh boots and are masked as they fill drums not unlike huge concrete mixers with a carefully balanced mixture of lead oxide and sulphuric acid.

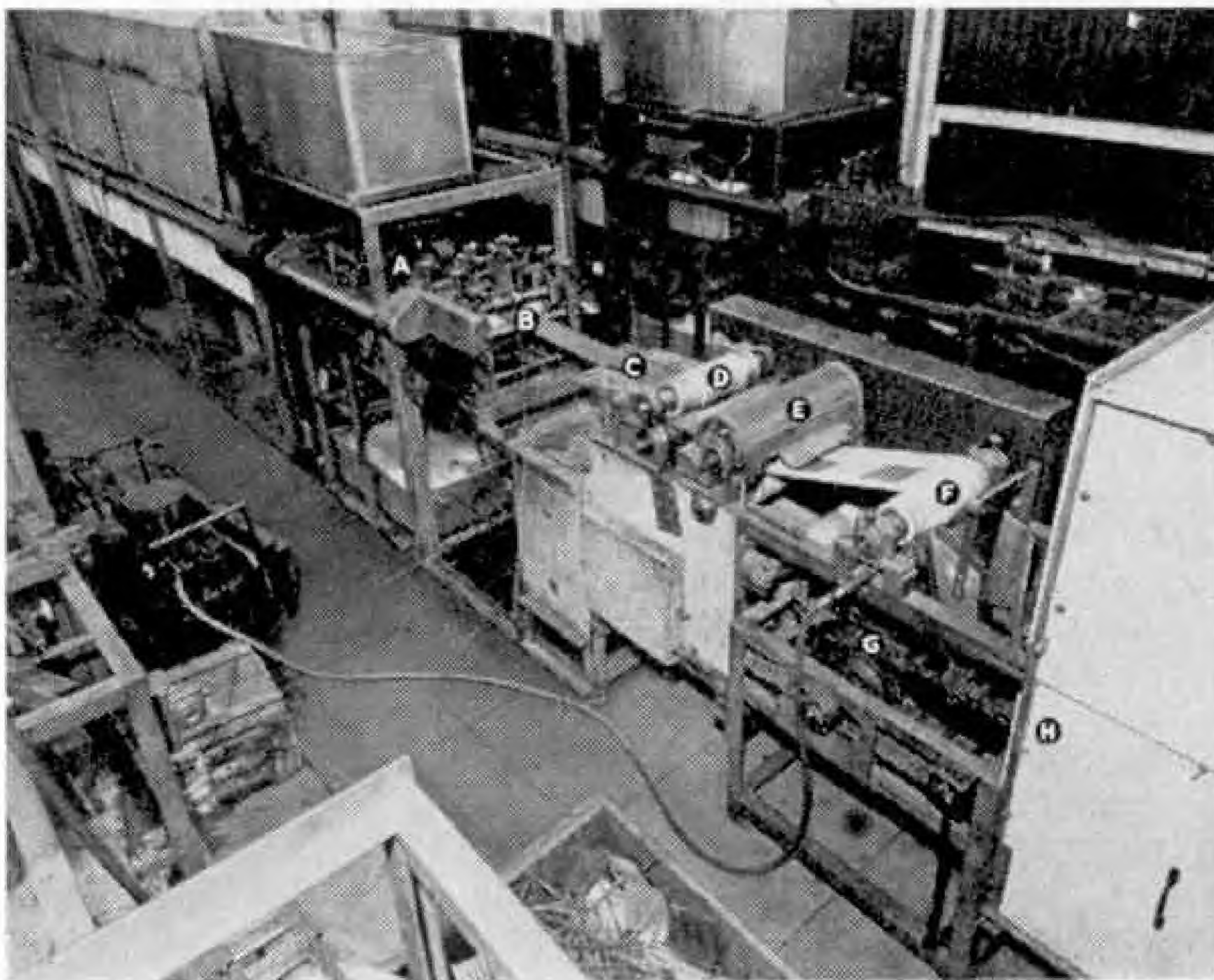
The next process—the actual pasting—looks easy but it requires a very high degree of skill. Pasting is done by hand or by automatic machine, and the speed and efficiency of the men pasting the grids for the special batteries has to be seen to be believed. Whether the work is done manually or automatically it is absolutely



essential that the cavities in the grid shall be evenly filled. This is ensured by a constant and minute inspection.

When the plates have been pasted they are dried out in special ovens ready for the next process—plate formation. This is an impressive business and takes place in a vast high-roofed shop which has a strangely quiet cathedral-like atmosphere that is very noticeable after the noise and hubbub of the other shops. In this peaceful building there are rows upon rows of acid-filled vats stretching away into the distance. These are filled with pasted plates, connected in parallel and linked to one another. The vats, in series, are subject to a constant 110-volt direct current charge for many hours, the actual time of the charge depending upon the type of plate. It is during this operation that the negative and positive plates become "live"—the one turning to spongy lead and the other to lead peroxide. As this process takes place the only noise heard is the gentle bubbling of the acid, giving off faint fumes.

Now the chemist steps out of the picture and machines take over. The plates, in batches, are ready for the burning up process. They are held in jigs and burned to a cross bar and



The Fibrak line in which the synthetic material is cut to the shape and size of separators required.

post, leaving the jigs as either positive or negative groups. The number burned up at a time depends upon the type of battery for which they are intended.

The groups are next assembled together, a positive group being interleaved with a negative but kept apart from direct contact with each other by thin separators.

These separators play an important part in the battery, and its efficiency and length of life depends largely upon them. Before the War, and even during its early stages, the substance almost universally used for battery separators was wood, in particular Port Orford Cedar. But in the early 1940's the growing demand for batteries by the Allied Forces led to the denuding of the best Port Orford Cedar plantations. In addition batteries being developed for special Service purposes called for separators of a quality for which even the best wood was inadequate.

Many attempts were made in the next few years to develop a suitable synthetic material, and it was found that the most successful was a combination of glass fibre

to acid is so much greater than that of cedar that the Oldham battery of today has a life half as long again as it had formerly. Of equal importance is the fact that the "Shelf Life" of the battery is prolonged. This means that it can be stored "dry"—without acid—for long periods.

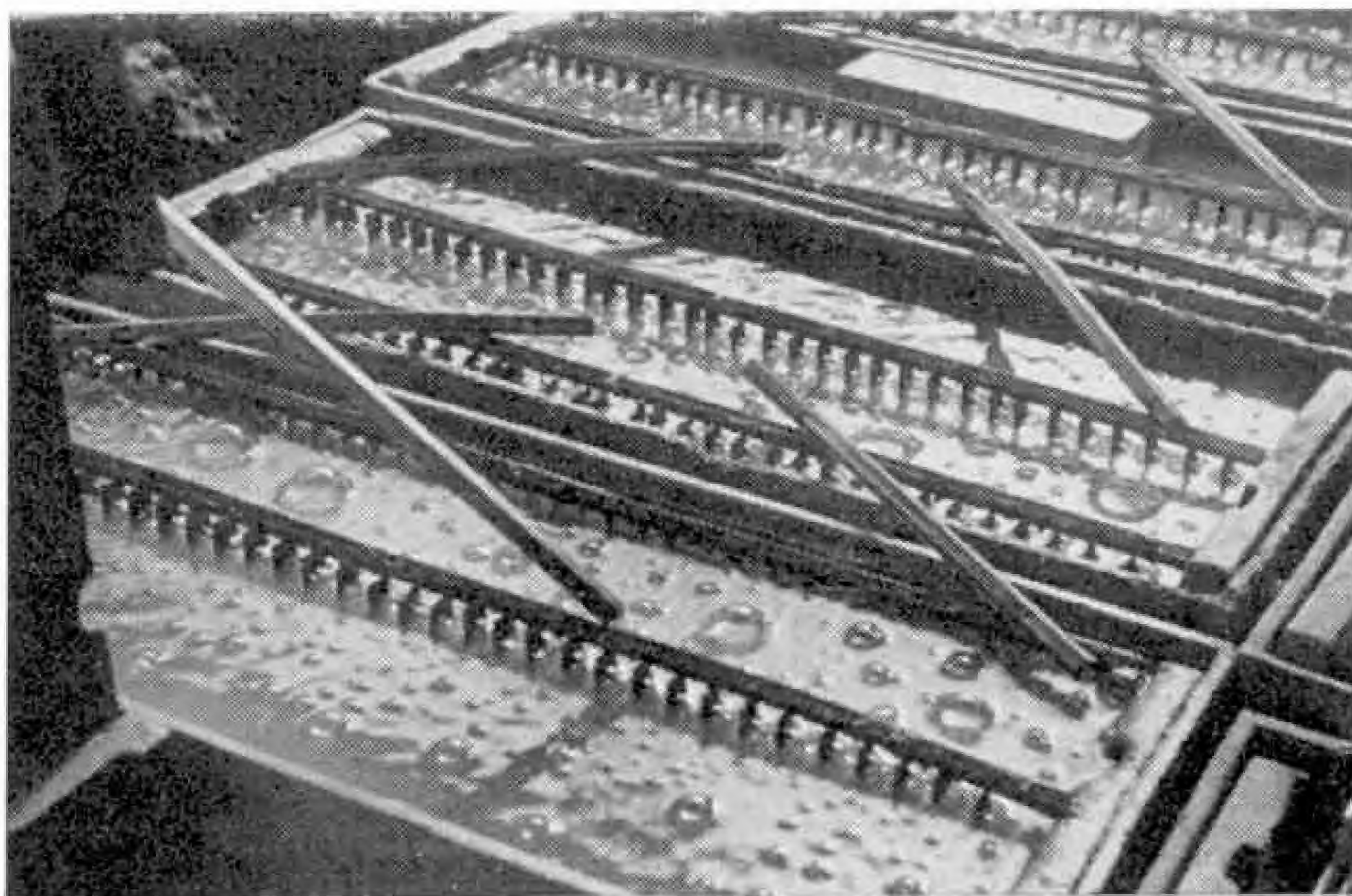
In the special Fibrak plant at Denton, which is the first installation of its kind in Europe, the separators are made in three stages—impregnation, crimping and drying. A roll of special glass-fibre Kraft sheet material is fed from motor-driven rolls into a tank of dilute liquid resin. Under pressure of rollers the excess of resin is removed and the band passes into a steam-heated oven to remove some of the moisture. At the other end of the oven the band is re-wound into a roll and transferred to the ribbing machine. There the material unwinds under a roller on to a turning drum kept at 620-630 deg. F., against the periphery of which rotate grooved steel rollers that impress the ribs in a continuous process. After giving an additional "kiss coating" of special resin

to the top of the ribs the band next enters an infra-red oven for its final cure, this treatment taking only 17 seconds.

Next the band passes through two rollers, the lower of which pulls up on to its surface a dilute solution of a wetting agent, and it is reduced to correct width and finally cut to length by a rotary blade. A chain of spikes below the blade, on the moving belt system, takes the separators through a final drying oven, where they remain for 10 minutes.

The process of making a battery is now nearly

complete. The battery boxes pass an electrical test to ensure their soundness. In the assembly shops groups of plates, separators, boxes and lids are assembled by long lines of women and girls working at benches with a moving belt. Connectors and terminal posts are burned on, sealing compound applied and the finished battery goes along the moving belt to have its final electrical test before being packed. It is then ready for one of the countless duties that batteries now perform.



Bubbles! This is a close up view of the bubbling surface of the liquid in the plate forming vats as current passes through them.

and Kraft paper pulp, treated with synthetic resin. That is the process developed in the Oldham research laboratories at Denton.

The separators produced by this process, are known by the trade name of Fibrak, and are used in most batteries made by Oldhams. They have the required electrical properties and are extremely porous, allowing the free passage of acid. You can, in fact, blow a puff of cigarette smoke through a Fibrak separator! Its resistance

BOOKS TO READ

Here we review books of interest and of use to readers of the M.M. With certain exceptions, which will be indicated, these should be ordered through a bookseller.

BRITAIN'S RAILWAYS

Edited by JOHN ST. JOHN
(The Naldrett Press 15/-)

Here is a book that in several respects is unlike the average book on railways. It is not a popular treatment of railway working, nor is it highly technical or suited to the enthusiast alone. Again, it is not the work of a single author who has visited here, or made journeys there, to see things for himself and pass them on to his readers. It is in fact made up of several sections, each dealing with some special branch of railway construction or operation and written by a specialist who in his particular way is daily concerned with the working of British Railways. In this particular instance this omnibus method of compilation is extremely successful, the various subjects being successfully knit together to form a composite, yet consistent whole.

A pleasing feature of the book is that the human aspect of railway working has not been neglected, for its editor contributes seven "railway profiles," as he calls them, in each of which the working day or duties of a particular member of the staff are graphically outlined.

There are a good number of well reproduced illustrations in half tone, with drawings where this particular form of illustration best suits the purpose of the subject, and each of the railway profiles is illustrated by a competent sketch.

WEST INDIAN ADVENTURE

By E. W. SWANTON (Museum Press 9/6)

This book gathers into one volume Mr. Swanton's daily records of the five Test Matches of the 1953-4 M.C.C.—West Indies tour, first published in *The Daily Telegraph*, of which he is the cricket correspondent. In addition to being one of the leading writers and radio commentators on this sport, the author is a first-class cricketer in his own right, and his day-by-day accounts of these dramatic Tests present a vivid and authentic pen picture of the games. The less vital matches played between the Test events are also described, and the accounts of all the games played are supplemented by innings tables and bowling analyses.

The book is more than a mere record of runs made and wickets taken, and in his introductory chapter the author discusses as impartially as he can the circumstances that made this tour in some respects less happy than its predecessors.

The book is illustrated with many fine half-tone pictures taken during the Test Matches.

TEACH YOURSELF ARCHÆOLOGY

By S. GRAHAM BRADÉ-BIRKS, M.Sc. (Manc.)
(English Universities Press 6/-)

Archæology—the study of ancient things—is a fascinating subject, the popularity of which is not limited to Museum authorities and University bodies. Nor does present-day archæological research consist solely of sending costly expeditions to ancient lands. Here, in this country, excavations on a lesser scale continue to yield interesting results—readers will recall the article on excavating in Dorset that appeared in the *M.M.* in October 1953 and another one from a reader in the issue for February last.

In the main this excellent book deals with the study of archæology in Great Britain. After a general survey the author has something to say about the crude flint implements used by Early Man, the improved tools of later Stone Ages, and the introduction of bronze tools. Then he turns to the Early Iron Age, and the coming of the Roman era in Britain. Architecture is another aspect of archæology to

which several chapters are devoted, and the author also shows how, by studying ancient inscriptions, coats-of-arms, place-names and surnames, archæologists have learned a great deal about life in this country many centuries ago.

The 120 line drawings with which the book is illustrated add greatly to its interest, and there is an excellent index and glossary.

CYCLING SPEED TABLES

(Temple Press 3/-)

These Tables were first published in 1949 as the only answer to the heavy demand for a single reference to cycling speeds at standard distances, and the times and distances were selected then to cover all performances to be anticipated in every class of event. Due to the all-round increase in cycling speeds, additions have now been made to the tables, all of which begin at a figure above current records. Cycling club officials responsible for producing times in miles per hour will find these Tables of great value, as also will the individual performer in keeping up-to-date with the performances necessary to win a national or local championship based on average speed over a number of distances.

The booklet also contains roller racing tables giving speeds from 100 m.p.h. to 42.9 m.p.h. at distances of 440 yards to 1 mile.

BRITISH RAILWAYS

Mechanical and Electrical Engineers' Department
Bulletin No. 6

Although Bulletin No. 7 in this series was referred to in the May *M.M.*, No. 6 now under review has only recently become available. This is because the initial tests of the class of engine described, the B.R. standard class 5 4-6-0 mixed traffic locomotive, showed that certain modifications were desirable and in order to follow this up alterations and further tests were carried out.

The Bulletin records in an extremely comprehensive manner details of the road and test plant performances, the data showing the extreme thoroughness with which the tests were carried out. Its contents are of special interest to the locomotive engineer and student, as might be expected in a report of this kind.

Copies of the Bulletin can be obtained from the Publicity Officer, British Transport Commission, Room 263, 222 Marylebone Road, London N.W.1 for 10/- each including postage.

"THE 'PRACTICAL MECHANICS' HOW-TO-MAKE-IT BOOK"

By F. J. CAMM (Newnes 12/6)

Here is a wealth of good ideas for the older reader who likes to make things for himself. The 35 subjects dealt with range from a tape recorder to an electronic organ, from a Spanish Hawaiian guitar to a photo-electric exposure meter. The instructions are supplemented by excellent half-tone photographs and detailed diagrams, and in the case of the more complicated subjects blueprints are obtainable from the publishers, details being given at the end of the book. A list of the materials is given in every instance, often with mention of the particular make of accessory used by the author.

The "things to make" included in the book are a selection from the many that have been published in the monthly journal *Practical Mechanics*, of which Mr. Camm is the Editor. Each article has been designed, built and tested in the workshop of that Journal, and therefore can be constructed by any amateur in the knowledge that if the instructions are followed the completed article will achieve all that is claimed for it.

Railway Notes

By R. A. H. Weight

Summer Train Services

Full summer services introduced during June or early July include provision of many additional holiday trains, together with a number of accelerations to the benefit of the business or ordinary traveller.

On the Western Region, the *Bristolian* has been quickened to a very fast non-stop schedule of 1½-hrs. each way, averaging fully 67 m.p.h., the eastbound run by way of Badminton involving considerable uphill work at the start. Start to stop speeds well over the mile-a-minute rate are booked from Chippenham to Paddington, and Paddington to Bath Spa. Notable accelerations affect the Kemble-Paddington run of the 8.0 a.m. Cheltenham-Paddington express, the 7.50 p.m. Paddington-Bristol, the *Pembroke Coast Express* and other South Wales fast trains. The *Cambrian Coast Express*, carrying daily through carriages between London, Aberystwyth and Pwllheli, has a 2-hr. timing each way for the Birmingham-Paddington run, so sharing in the quicker services along the Bicester-Leamington route. A remarkable number of long distance expresses is being operated by all Regions on Sundays, with additional connecting or stopping trains on some lines.

The world-record 393-mile non-stop journeys between London (King's Cross) and Edinburgh (Waverley) by the *Elizabethan* are timed in 6½-hrs. this year, at the remarkable average of 60½ m.p.h. throughout. The 66 m.p.h. Hitchin-Retford booking continues for the morning business express from King's Cross to the North, with lively timings for the corresponding up train, and for the *Tees-Tyne Pullman* and a number of other principal services, especially between Darlington and York, and Ipswich and Norwich, as well as for passing times along the East Coast route between Hatfield and Retford.

The Southern as usual is providing an intensive service of week-end steam and electric trains running to coastal and other resorts, plus daily extras. An addition to through trains from the Midlands is provided from Sheffield, Nottingham and Leicester, E.R., to Brighton, Eastbourne and Hastings. Last year's accelerations are maintained. The 11.10 a.m. Hastings-Charing Cross train has been speeded up, and another daily electric fast train provided on the Hastings-Eastbourne-Victoria route. The *Devon Belle* on Fridays affords a new early evening service from Waterloo to Salisbury and beyond. Owing to the intensity of traffic on summer Saturdays, additional time is allowed to many expresses, so a number of the fastest schedules quoted apply from Monday to Friday only.

The London Midland Region is naming two fast trains on the Liverpool-Euston run, *The Shamrock*, up in the morning and down in the evening, connecting with sailings to or from Belfast and Dublin. Passengers by the *Ulster Express* via Heysham now leave London much later, but are due in Belfast at the same time as last year. The *Royal Scot* is providing a 7½-hr. service between London and Glasgow, necessitating passing times south of Crewe averaging more than 60 m.p.h.

This is also the case for the northbound *Comet*, London-Manchester express, and the 7.55 a.m. business one from Euston to Lancashire calling at Watford to take up. There is on the whole a generous service of fast trains serving main line and principal routes.

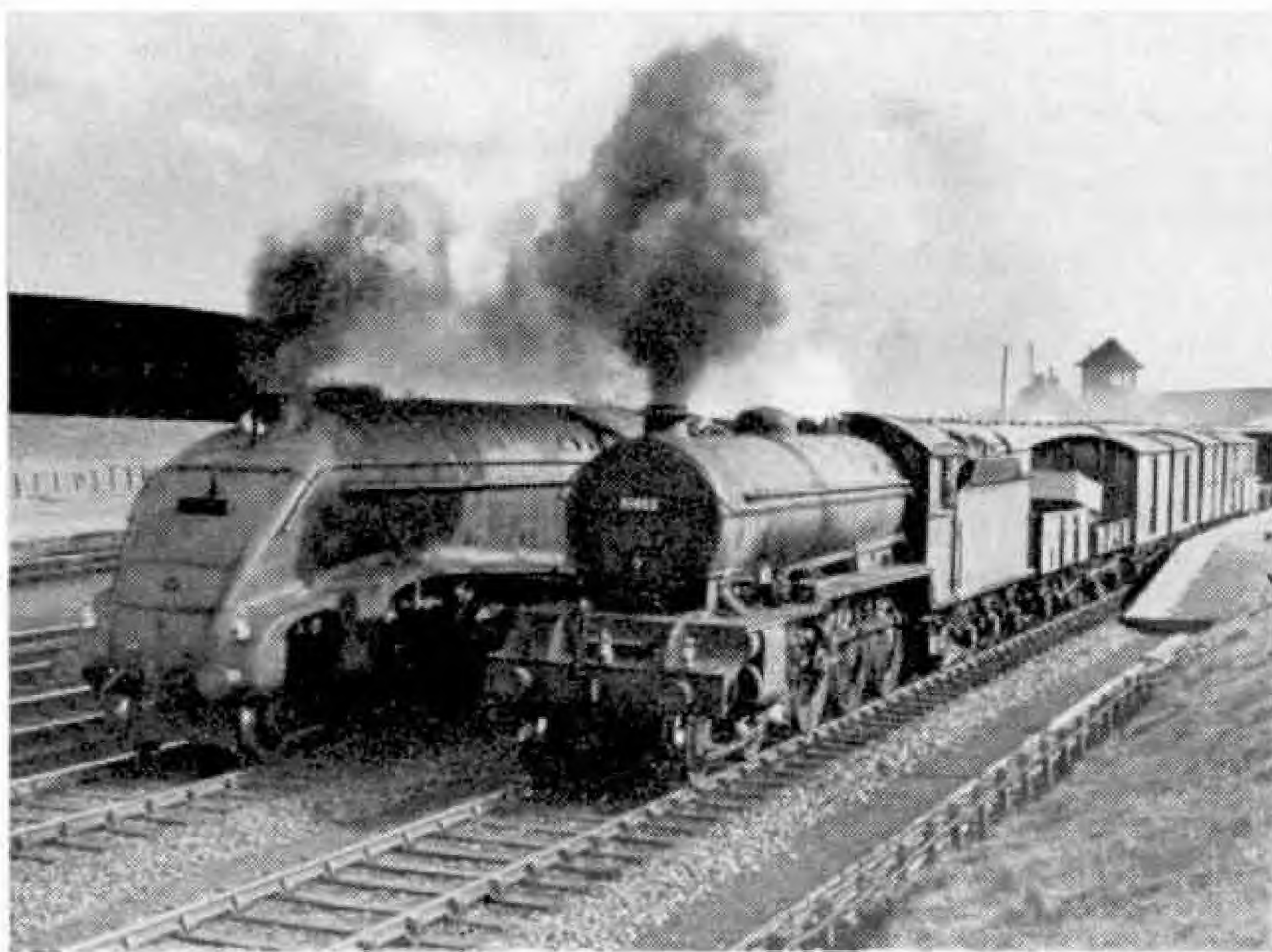
The Metropolitan Special

It is unique indeed in these days to make an afternoon round trip of semi-fast character covering nearly 100 miles behind an elderly 0-4-4 tank locomotive, and furthermore to travel part of the way over the Underground, Inner Circle and other long-electrified suburban lines on the Metropolitan (London Transport) system. This was possible in a *Railway World Special*, on 23rd May, carrying red and white headboards, on which I was a passenger with a number of friends.

The engine, L48, with five bogies, performed excellently, attaining speed round about 50 m.p.h. on several occasions when clear of the inner suburbs, whether bunker or chimney first. In the latter form on the return journey a mile-a-minute maximum was just touched descending past Chorley Wood after going out to Quainton Road, Bucks., through hilly country with sharp gradients, making calls at Willesden Green, Rickmansworth and Aylesbury. There was much civic and public interest.

Eastern and North Eastern Tidings

From accurate friends keeping a close watch on



Streamlined Pacific No. 60019 Bittern overhauls a fast freight train at Beningborough, N.E. Region. The engine of the latter is a former North Eastern 4-6-0 rebuilt by the L.N.E.R. Photograph by W. Hubert Foster.

locomotive and traffic working in the neighbourhood of King's Cross I learn of a notable series of early arrivals at King's Cross by A4 engines. These included up to 8-9 minutes on the *Tees-Tyne Pullman*, which has a 60 m.p.h. timing from Darlington, and greater gains, either actual or nett allowing for delays, by the *Flying Scotsman*, up Leeds and other expresses not booked quite so fast.

Various classes of 4-6-2, as well as some V2 and B1 locomotives, have shared in such enterprises, and the Green Arrow 2-6-2s from King's Cross have been achieving high mileages recently, working passenger trains in between express freight duties to Doncaster and York owing to the large number of Pacifics temporarily out of service for repairs.

J15 0-6-0 No. 65479 usually employed locally at Hitchin was noted on a main line ballast train at Huntingdon. Also seen were a Neville Hill (Leeds) B1

on a Farnley passenger train working from Leeds to Manchester, Exchange, Director 4-4-0 No. 62662 in smart condition on Cheshire Lines Liverpool-Manchester expresses, and B16 4-6-0s, stationed largely at York, far afield at Carlisle, and also on the former G.C.R. and G.N.R. sections.

International Congress and Railway Exhibition

A congress of railway officials representing 30 countries with membership exceeding 400 was held in



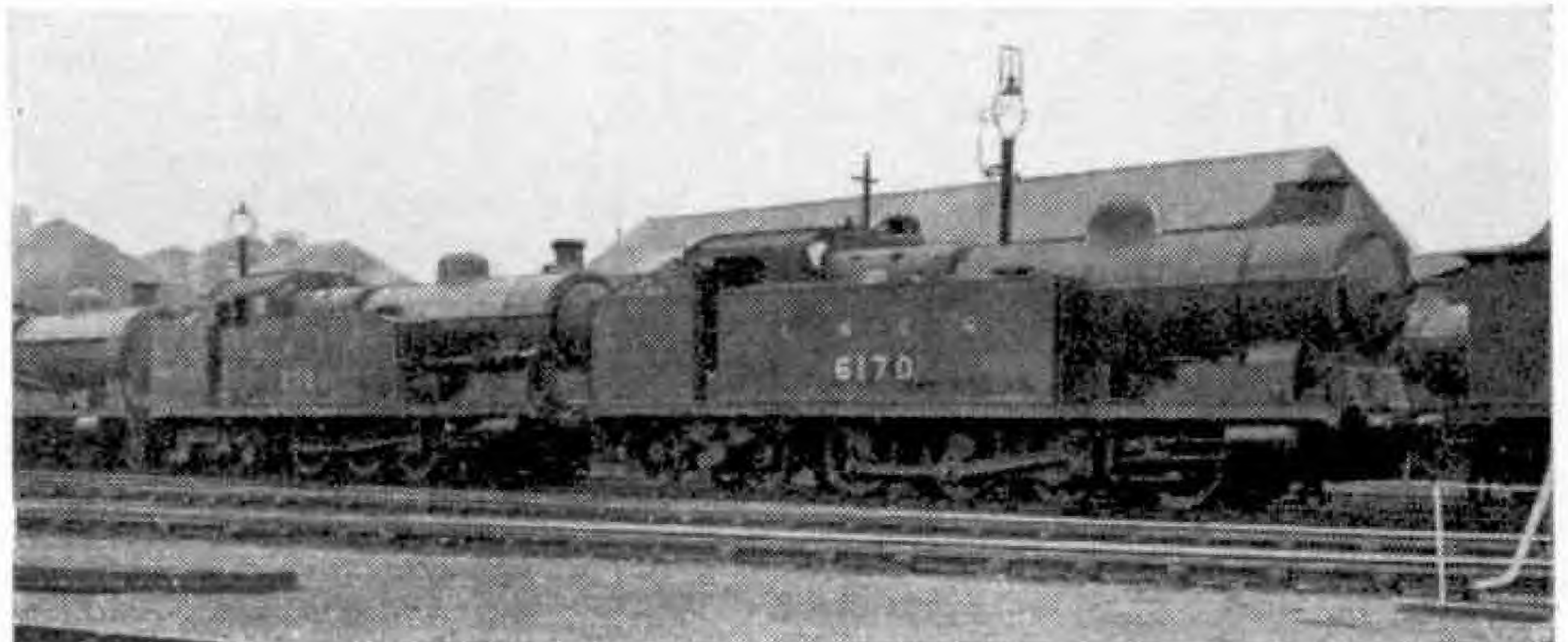
A holiday view in Eire from the viaduct over the River Glensesk between Mountain Stage and Kells on the C.I.E. Line from Tralee to Valencia Harbour. Photograph by David Parkes.

London last May, the first meeting of the kind in Britain for 29 years. Some exceedingly well provided special express trains ran conveying parties inspecting tracks, railway works and other installations in various parts of England and Scotland.

A feature, also open to the public at a small charge for 3½ days after official visits had taken place, at L.M.R. Willesden Motive Power Depot in N. London, was an excellent exhibition of locomotives, rolling stock and railway equipment exemplifying recent British progress and practice.

I attended the Press pre-view by invitation and saw among so much No. 71000, *Duke of Gloucester* a new type 4-6-2; representatives of B.R. Britannia, class 9 2-10-0, classes 5 and 3 4-6-0s, class 4 2-6-4 and class 2 2-6-2 tanks. There were also electric locomotives and rolling stock, including London Transport coaches, a diesel light-weight unit for local passenger service, diesel-electric, mechanical and hydraulic shunters, and gas turbine and Fell 4-8-4 experimental locomotives. Equipped cafeteria and sleeping cars, modern corridor coaches, wagons, special freight vehicles and mechanical apparatus of all kinds also were on view.

An original G.C.R. 0-8-4T and one of the L.N.E.R.-built engines of similar design, but including a steam powered or "booster" bogie. These were photographed at Mexborough by W. H. Whitworth.



News from the Western Region

A Rehabilitation Workshop has been opened at Swindon Works. The object is to provide suitable productive work during convalescence for men who have been injured or ill, and are not at the time fit for normal full duty.

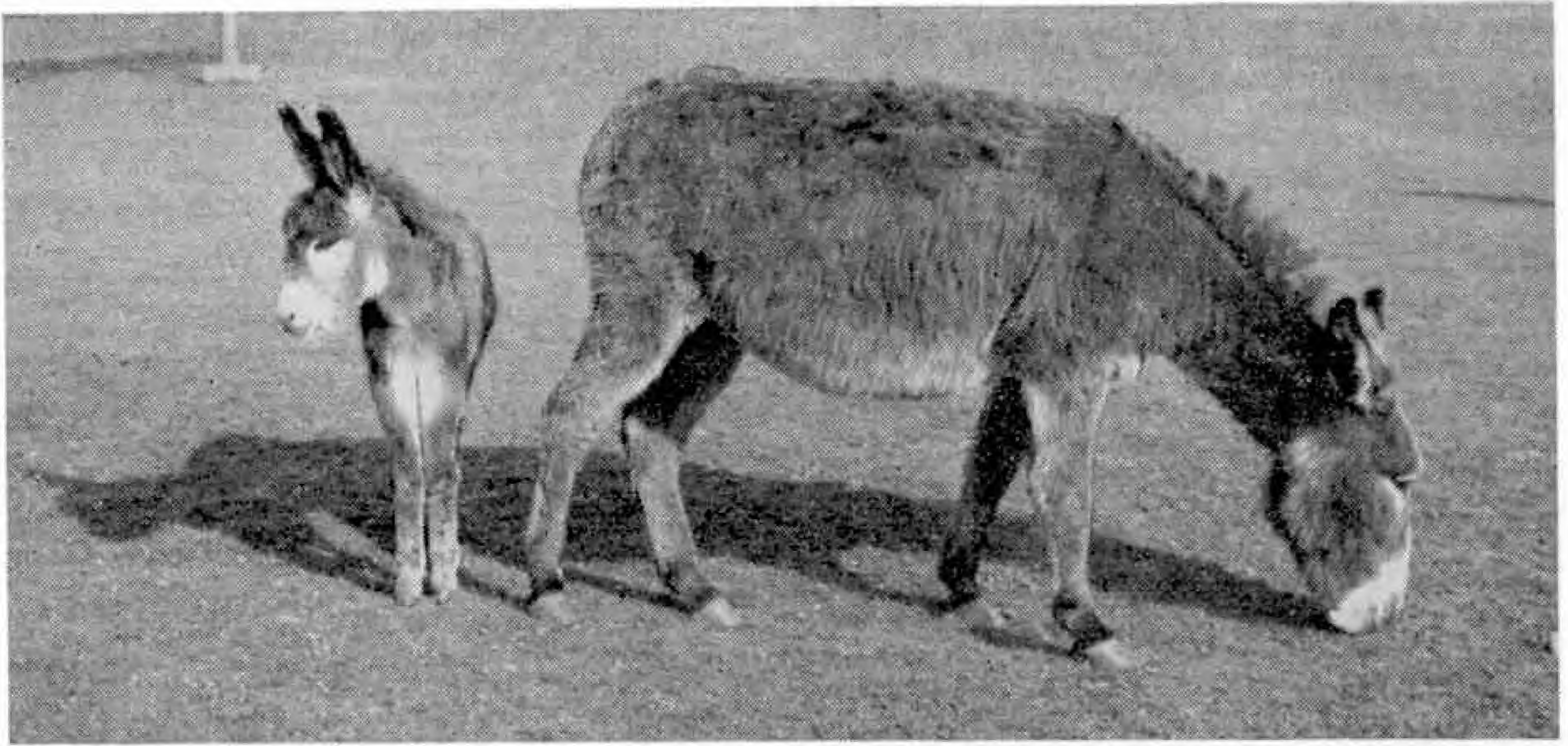
The last 2-4-0, No. 1336, has been withdrawn. So have No. 5, former L.B.S.C.R. Terrier tank, more recently Weston, Clevedon and Portishead Railway No. 2, and 4-4-0 No. 9001. Trials with engines of the last named class have been on banking duties and light trains in S. Devon. Two of them also hauled a special train to Swindon from Victoria, S.R., via Kensington and Acton, organised by the Railway Correspondence and Travel Society. Standard 4-6-0 No. 75025 has been completed as well as class 3 2-6-0s for Scotland numbered 77005-8, with others in hand. Received from contractors were 0-6-0 pannier tanks Nos. 8441 and 8444.

The driver of *Hereford Castle* might have been preparing for summer accelerations when he ran the *Pembroke Coast Express* into Newport 7 min. early at Easter with a 9-coach train, several signal slowings included. The 133½ miles from Paddington were covered in about 143 min. nett; the present Monday-Friday timing allows only 141 minutes. In the opposite direction with 13 on, 445 tons full, Britannia 4-6-2 No. 70015 *Apollo* completed the run in 138 min. net, allowing for some severe delays, arriving in London nicely to time after starting 7 min. late. There was some excellent climbing up the long pull from the Severn Tunnel to Chipping Sodbury. These runs were recorded by Mr. D. S. Barrie, M.B.E.

No. 6014 *King Henry VII* fitted with blowdown and water sampling apparatus has been working on Wolverhampton-Paddington express duties, stationed at Stafford Road. *Mercury*, one of the standard Pacifics, was lately reported to be engaged in film making with a night special train on the Windsor branch.

Another Southern Main Line Diesel

The third Southern main line diesel locomotive, No. 10203, was turned out of Brighton Works a little while ago. After preliminary trials from Brighton it made several journeys between Waterloo and Salisbury on a 400-ton test train.



A donkey and her foal in the New Forest.

THE donkey has been described as having the awkwardness and slowness of an elephant without the intelligence. But the ass throughout history has always been a much belied beast. While it is certainly a stubborn "moke," it is in no way senseless!

At long last we are beginning to realise that the more you put into a donkey, and the greater care you take of it, the more you can get out of him. If you treat a donkey well he will work if he feels like it; but treat him badly and he will assuredly go on strike. It is far better not to try and "conquer" a donkey but to "persuade" it by kindness that it is indeed doing what it wants to do.

The wild ass from which our domestic donkey has been bred is a fine upstanding animal, often reaching 12 hands at the withers. It is strong and has a long, fast trotting stride. Rather strangely, when at speed it holds its head upright and at right angles to the body as if resisting the pull of an invisible rein.

Many early travellers in Syria and Mesopotamia wrote of the wild asses they saw and all were impressed by their swiftness. Xenophon, when he travelled over Arabian plains, mentioned "the beautiful herds of asses," and said that only the fastest of the horses were able to keep up with them.

It is only in countries where the breed has been domesticated and then neglected

that the donkey has deteriorated to a miserable little half-starved creature, ill-fitted for any task and unwilling even under forceful persuasion.

There are very many different kinds of donkeys and animals such as the zebra that are closely related to the ass family. One thing they all have in common is that they all bray noisily!

The finest donkey in the world is the Poitu ass, a beast that sometimes reaches 16 hands. Somewhat resembling a carthorse in build, this is used almost exclusively for the lucrative business of breeding heavy-weight mules. For producing faster mules of lighter weight the less clumsily built Andalusian and Catalanian asses are reared in Spain.

Another fine donkey is used for ploughing and general farm work in Damascus.

"At the opposite end of the carrot" there are some very small donkeys reaching barely seven hands when fully grown. The Gudha breed of India is the dwarf of all donkeys, but these diminutive breeds are very hardy and vigorous and seemingly able to bear stoically the last straw that so often breaks the camel's back.

Though domesticated donkeys vary a good deal in size and form from the wild ass, there is very little change in the slate grey colour. Some tame donkeys tend to go black, while others turn almost white, but no one has ever yet bred a chestnut or bay donkey.

The Truth about the Donkey

By R. H. Ferry

Donkeys are not so hardy as horses, a point often either not known or ignored. They should never be put into a field without good shelter against the wind. These animals are very sensitive to changes in the weather; in fact their temperament and mood varies directly with fine or wet weather. In the old days, if rainy weather was likely, donkey owners had the cruel habit of tying down the tail of a donkey to its hocks to assure a night's sleep and peace, for a donkey cannot "give voice" without sticking out its tail in a rigid fashion, and pumping it up and down.

The more humid the weather the more sluggish and sullen a donkey becomes. Therefore, if you intend buying a pet donkey, always try and do so on a wet or dull day, when you will be seeing the beast at its worst and with all its faults. On the other hand if you want to sell a donkey to advantage do so on a hot, fine day, and he will be at his best and most lively form!

Donkeys always go best for their owners on nice clean sand; perhaps this is why they are such popular mounts for children at the seaside. These strange and often perverse animals have a strong

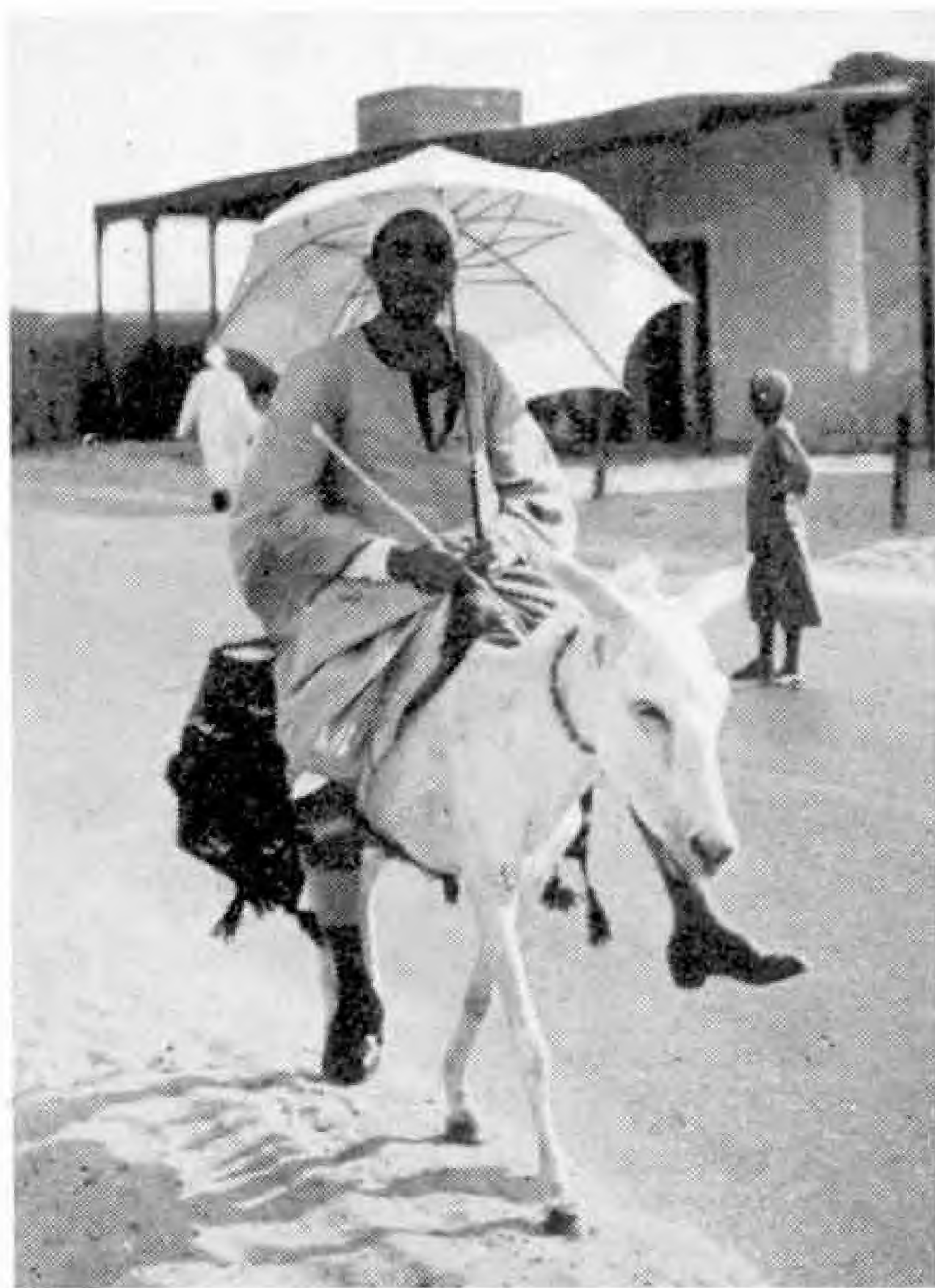


Portrait of an animal of character.

dislike for muddy lanes and will pick their way reluctantly along such a track, avoiding every little puddle and muddy rut with the fussiness of a cat. They appear just as much to dislike hard, smooth macadam surfaces, for their hooves are small and narrow and ill-fitted for jars and shocks on the fetlocks.

If you are on the look-out for a good riding donkey do not be misled into thinking that a big-boned, large-headed Ned is the best for the purpose. Such beasts are more suited for the shafts of a trap, which they can pull at a walking pace. The fastest saddle-donkeys are often the smaller, neatly fashioned beasts, though long ears are always a sign of good breeding. In fact, the smaller the donkey the faster it goes.

In the East, especially in such countries as Egypt and Palestine, where the climate is hot and the atmosphere dry, the riding donkey can be seen at its best. It is usually well-groomed and treated by its master, though it may only have cost 2/6 in English money. In many lowly stables in the Middle East you will see the donkey's saddle and bridle carefully hung upon a peg, the proud possession of the owner. The harness is often elaborately decorated with colourful beads or leather worked in a fine filigree and intricate pattern with copper wire. A symbol to ward off the



A beast of burden.

Evil Eye is a popular one worn as a medallion on the donkey's forehead. When an Arab rider sets out to visit his friends, or on a shopping expedition to a near-by market town, he puts on his best clothes



Here is a foal that makes just a good armful.

and is very proud of himself and the mount between his dangling legs.

In contrast the donkeys used in the East as "beasts of burden" are often badly treated. Unfortunately, they usually belong to very poor natives who have no pride in themselves or the beasts in their charge. Along the Nile banks I have often been passed by strings of these poor asses hopelessly overburdened and staggering under the great weight of huge panniers hung on either side. Sometimes these baskets are so big that the donkey is quite hidden from view.

But when the Oriental ass is carefully cared for it is superior to ours, with more delicacy and docility. It is certainly a

far better animal from every point of view than the camel, which is the most stupid and bad-tempered domesticated beast in the world.

Though at a casual glance a donkey may not seem a very impressive or striking animal, there is something about its personality and character that holds the eye and catches the imagination. Few celebrated artists have been able to resist painting the animal, and many great writers past and present have praised or decried it. Cervantes gave this animal to the immortal Sancho Panza. Even mathematicians have not forgotten the oft-despised donkey, for is there not a bridge in Euclid bearing its name?

The ancient Hebrews knew all about asses, both as beasts of burden and as riding animals. The wise Job showed a good understanding of the ass's

character when he wrote:

"He scorneth the multitude of the city;
neither regardeth the crying of the driver."

The ass is mentioned in the Bible more often than any other animal, and it is well to remember that in religious history the donkey is a greatly privileged animal. Together with the ox, it was in the lowly inn stable in Bethlehem where the Babe Christ was born. And afterwards The King of Kings chose the humble beast to ride when he entered Jerusalem. It is pleasant to think that the cross that a donkey bears upon its shoulders is a mark showing that Our Lord blest the ass for its services to Him.

Waterways Under the Hills

(Continued from page 338)

of locks in England, and the deepest narrow lock, replacing an early boat lift, it has five tunnels. These, in order from Worcester are Dunhampstead, 230 yards, Tardebigge, Shortwood, 630 yards, West Hill, and Edgbaston, 105 yards.

Other tunnels that are now impassable owing to subsidence, apart from Sapperton and Lapal, are Greywall, 1,200 yards, on the Basingstoke Canal, Norwood, 3,102 yards, on the Cromford Canal and Butterley, 3,063 yards, on the Chesterfield Canal. There are also two examples where tunnels were removed, or opened out, and the canals concerned now run in deep cuttings. These are at Fenny Compton on the Oxford Canal, shown in the upper

picture on page 338, and Rowington on the Grand Union. Strangely enough, although altered upwards of a century ago, canal folk of to-day still refer to them as "The Tunnel".

Savernake Tunnel on the Kennet and Avon Navigation is named "Bruce". It has the largest cross section of any of the canal tunnels.

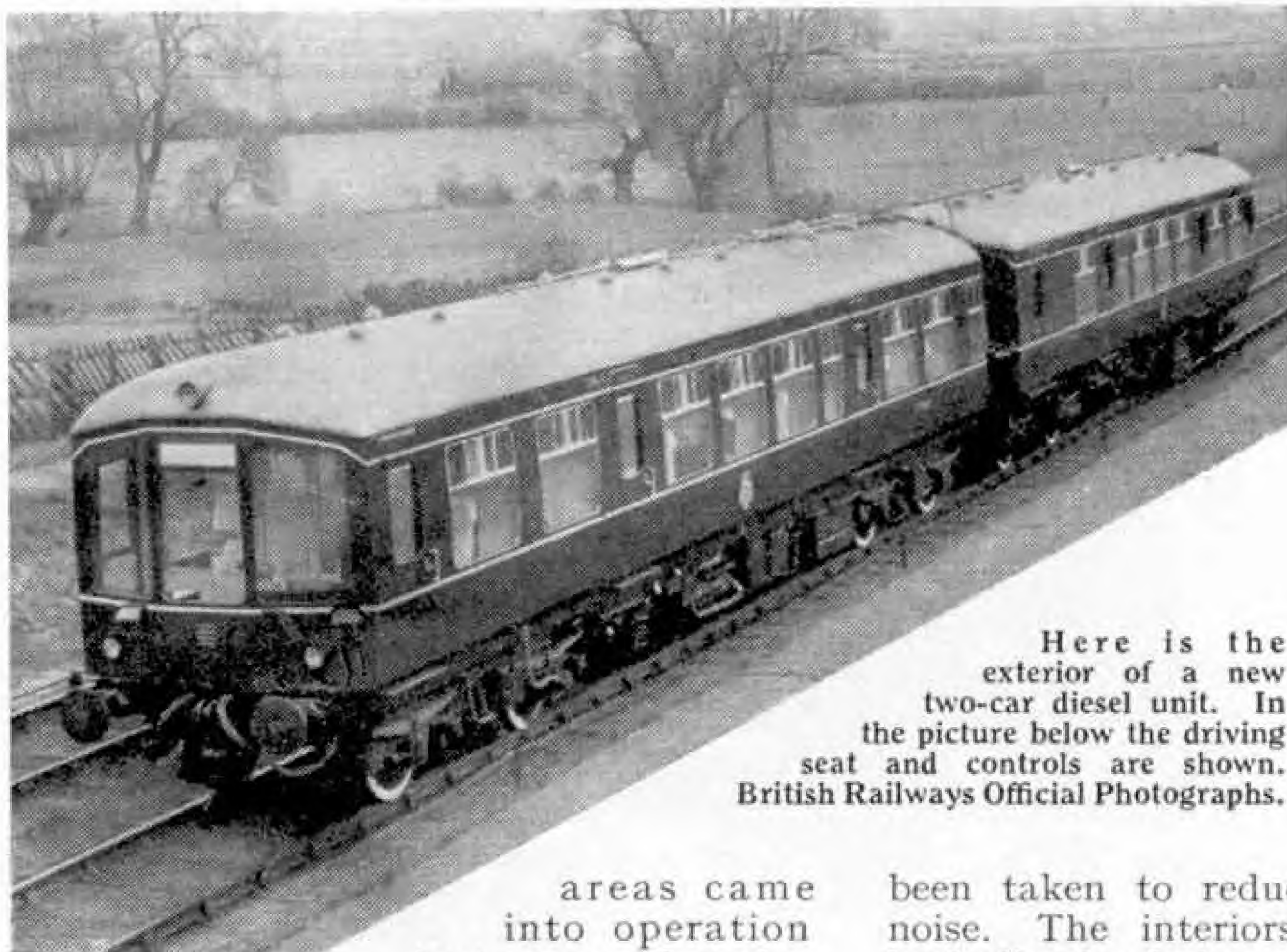
In this article we cannot hope to tell all that is of interest about these dark and gloomy bores. We can, however, invite you to get your maps out and trace where a canal "goes to earth," and then go and see for yourselves. And, who knows?—you may be lucky enough to get a boat to take you through.

New B.R. Lightweight Diesel Trains

WITH the beginning of British Railways Summer train services part of the scheme for the introduction of lightweight diesel passenger train services in certain

released by the driver, after a 5-second delay, the engines return to idling speed, the torque converter in the transmission assumes the neutral position and the vacuum brake is applied to bring the train to a standstill.

The bodies and underframes of each car are built up as one unit, giving great strength with comparatively light weight. The bodyside panelling is welded up to form continuous sheets from door to door and is then rivetted to the frame members. Light alloy metal is extensively used and special measures have



Here is the exterior of a new two-car diesel unit. In the picture below the driving seat and controls are shown. British Railways Official Photographs.

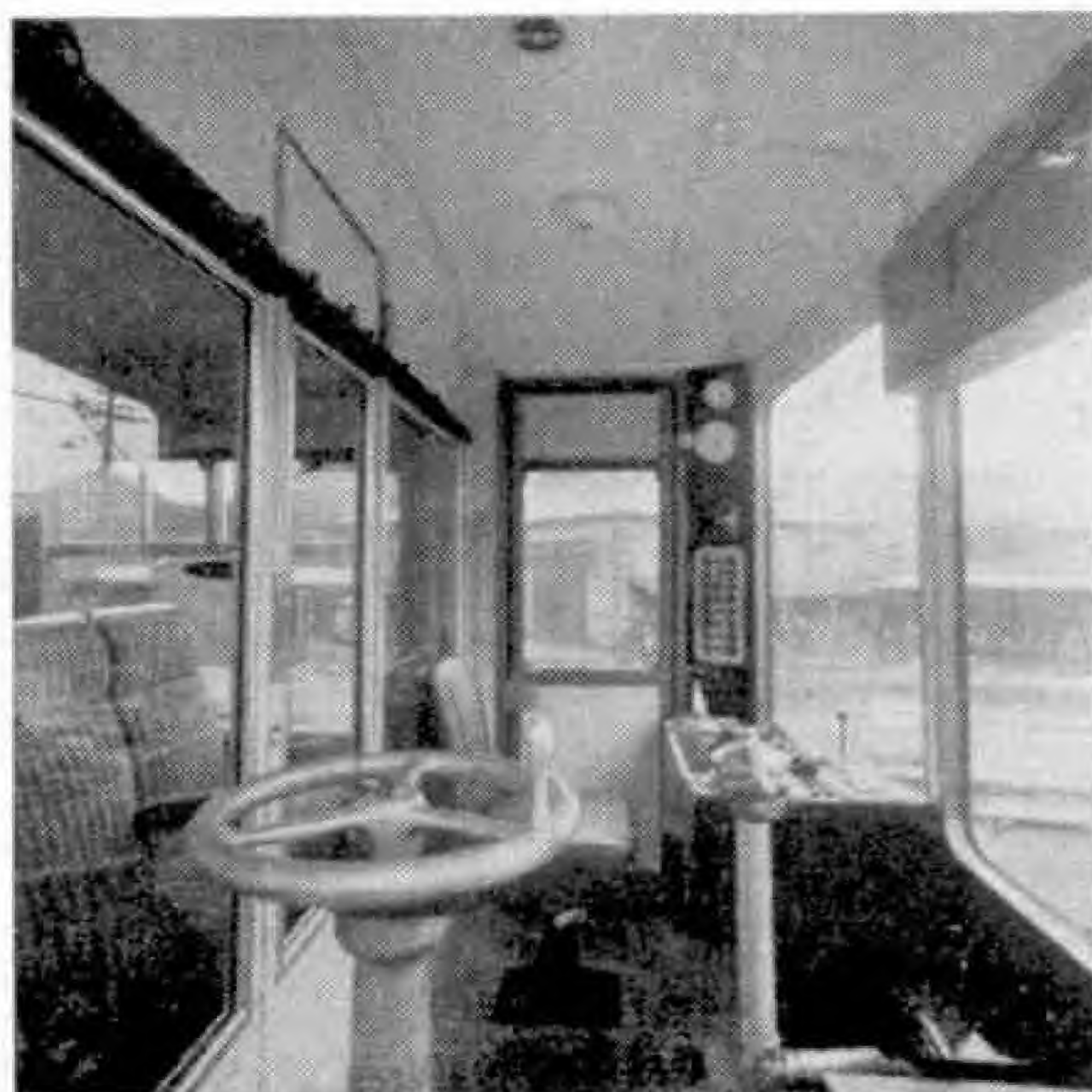
areas came into operation between Leeds, Bradford, Harrogate and Castleford, where a service of half hourly intervals through the day, with certain adjustments, is being run.

The basic unit in the make-up of the new trains is the two-car set shown here. In each set one vehicle with two bus-type horizontal engines under the floor forms the power car and the other is usually a trailer car, but if required, as in the steeply-graded West Riding, two power cars are used together. Each form of two-car unit can be driven from either end, but in addition it can be assembled into multiple-unit formations of four, six, or eight vehicles according to requirements. Electro-pneumatic control arrangements ensure that the engines of several units up to the maximum can be driven together from any one driving position.

The driver has a splendid view ahead; so incidentally, have the passengers fortunate enough to have seats behind the glazed bulkhead that separates them from the driver. They are in effect "footplate passengers". The main control handle in the driving compartment is arranged with "dead-man" control so that should it be

been taken to reduce condensation and noise. The interiors are attractive yet basically simple in general effect. The cars are finished in B.R. engine green with yellow lines above and below the windows.

On an official demonstration trip between Marylebone and Beaconsfield, the outward run was made as a stopping train. The return run was made non-stop, the 23 miles being covered in 32 minutes.



On the Road

By J. Dewar McLintock

THIS month it is going to be difficult for me to cram all my news into the available space. It is perhaps as well that I cannot say a great deal about the sporting side, because at the time this is written several highly important events still lie ahead. And in any case, in earlier events the Italians have been showing so much virtuosity that it might all be a little sad!

But in other directions the picture is a bright and interesting one, particularly where industrial matters are concerned. One of the highlights has been the introduction of a revolutionary diesel engine by the Rootes concern, while at the British Industries Fair the Rover company

the employment of a supercharger, driven from the crankshaft.

Another remarkable thing about the engine is that the effort produced by the pistons goes "round corners". That is to say, there are two con-rods with a rocker between them, for each cylinder. Although this means more reciprocating parts, it also means *less* angularity of motion, while in any case there is no valve gear to bob up and down. The engine develops 90 b.h.p. at its maximum governed speed of 2,400 r.p.m. There are no cylinder heads, so that high thermal efficiency is a feature.

The start of the recent Tulip Rally, a scene at the Hague. The foremost car shown is the Consul driven by Jack and Peter Reece. The former, who can just be distinguished in the car, writes about the Rally in next month's M.M.



exhibited and demonstrated their gas turbine in light industrial form. Morris-Commercials announced *their* new

oil engine, and in America, I am told, an interesting wobble-plate, or swash-plate engine was shown to technicians.

The Rootes engine is a three-cylindered, six-pistoned, horizontally-opposed unit of unconventional design . . . ! For those who do not care to digest that in one hunk, I had better say that this job is a flat engine, with three crosswise cylinders. Each cylinder has two pistons in it, and the combustion chamber is *between* the two pistons. That is to say, air is pushed into the space between the pistons, and fuel is injected at the appropriate instant, the cylinders having inlet ports at one end and exhaust ports at the other. The two-stroke cycle is used, and this gives a power stroke for each revolution of the crankshaft. It also demands

By comparison, the new Morris-Commercial engine is conventional, and I will economise on space by merely saying that it gets remarkably good results for its size, and is unusually clean in operation. It gets its fuel in the right quantities at the right time, and burns it effectively, due to good combustion-chamber design. This makes for economy of operation, of course, and another good characteristic is that this engine is easy to start, even at the lowest temperatures. I tested a three-tonner with this motive unit, and liked it.

I have mentioned the Rover gas turbine. This of course has been developed from the unit used in the now world-famous turbocar, and is a 60 h.p. portable unit weighing little over a hundredweight. This little engine meets a need for a light power unit of great reliability and ease of

maintenance. It could be used for fire pumps, oil-well pumps, blast-furnace heating and power supply, electrical generators, etc. It uses no water and very little lubricating oil, and could work on paraffin, petrol, coal gas, blast-furnace gas and even sewer gas! No electrical ignition is necessary once the engine has been started. Normal speed is

The new Series II Morris Oxford, a trial of which is briefly described on this page.

46,000 r.p.m., reduced to something between 3,000 and 5,000 r.p.m. for power take-off.

The American Herrmann engine has something in common with the Rootes engine, in being of horizontally-opposed type and having double pistons. But a "wobble-plate" arrangement replaces the crankshaft, camshaft and connecting rods of a normal engine. Students of design will be familiar with this scheme, whereby the pistons push or pull an inclined "dinner plate" and the basic idea is very old. But history is always repeating itself in engineering.

Near the end of May, I was invited to see and try the new Morris-Oxford. This is based on the same components as the old, but has a new engine—an o.h.v. 1½-litre and a re-styled, bigger body. This results in much better performance and greater comfort and convenience,

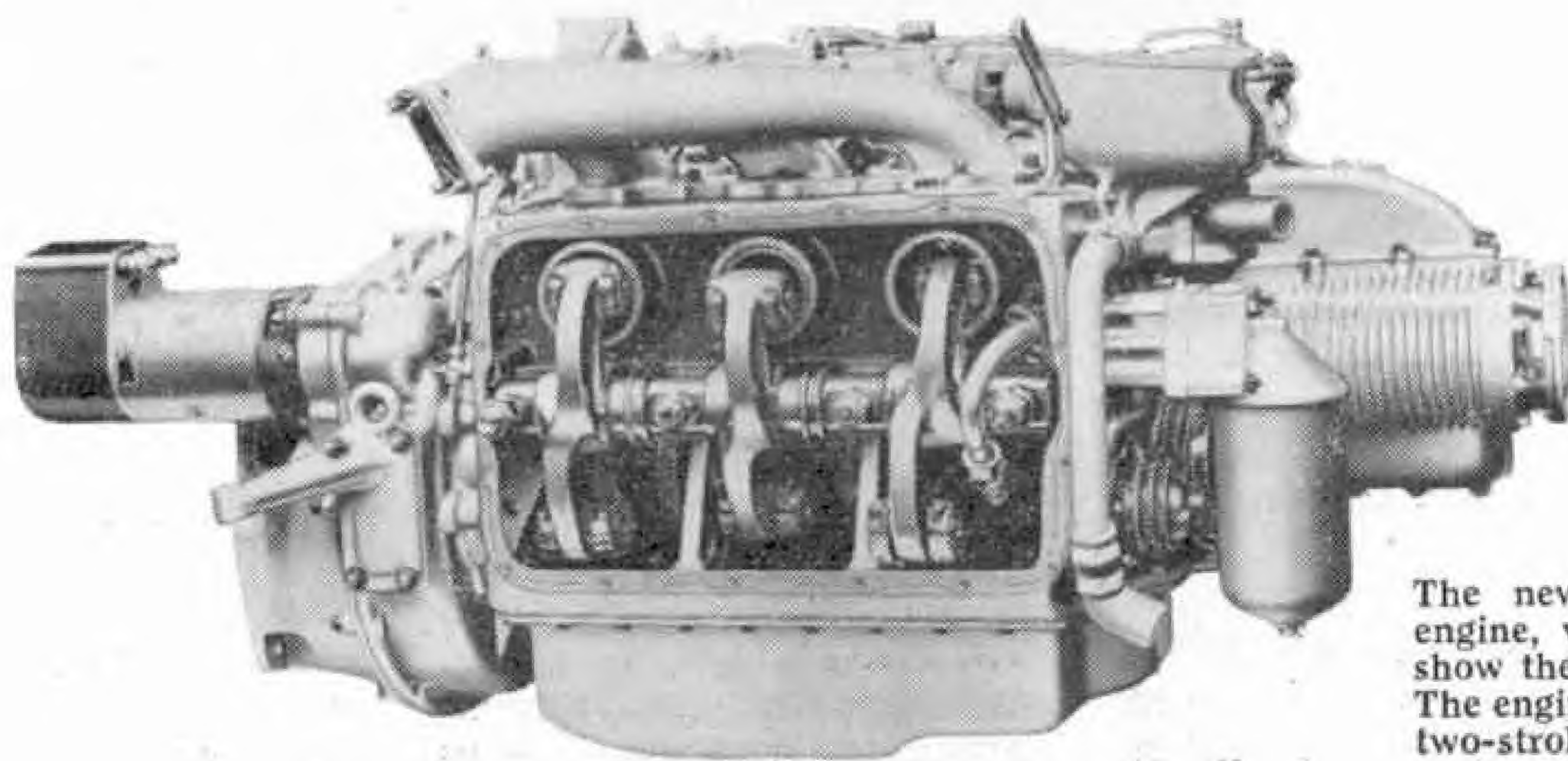
coupled with the excellent Oxford steering and road-holding, which I have praised so often. I would say the new styling was decidedly continental, and the car reminds me of a mixture of Simca Aronde and Fiat 1400, by which I mean more



flattery than disrespect! Just look at the picture of the Simca in last month's *M.M.*

A few weeks ago the motor industry's new proving ground and research laboratories were officially opened at Lindley, near Nuneaton. The new perimeter track looks good—if a little awe-inspiring!—and brings nostalgic memories of Brooklands, to me if not to you, for of course the track has been derelict since 1939.

The Lindley proving ground would be a grand place to spend a day with, say, a competition Norton and an Austin-Healey! However, I have something even more exciting to look forward to, because I am taking a new Anglia to the Swiss Alps in a few days.



The new Commer "T53" diesel engine, with its cover removed to show the rockers and rocker shaft. The engine is of the direct injection, two-stroke opposed piston type.

DINKY NEWS

By **THE TOYMAN**

Bedfords, Large and Small

ONE of the most interesting and pleasant jobs that falls to me, as The Toyman, is that of reading the many letters I receive from keen Dinky Toys collectors. This correspondence has increased considerably during the last few months, and each day brings me dozens of letters from boys and girls, together with a generous sprinkling from enthusiastic parents, in which they put forward suggestions for new Dinky Toys and tell me exactly what they think of the latest additions to the range. Generally, I am glad to say all of the latest items have been received with great delight and enthusiasm by Dinky Toys collectors everywhere, and this applies particularly to the recent additions in the mechanised army series. The greatest demand I find is still for road vehicles of all kinds, and this assures a ready welcome for the two latest introductions, the Bedford 10-cwt. Van "Kodak", Dinky Toys No. 480, and the 3-ton Army Wagon, Dinky Toys No. 621, both of which were announced in the June issue of the *M.M.* and are now appearing in the shops.

The Bedford "Kodak" Van is based on a vehicle that is to be seen about the country, especially during the summer months, busily engaged in delivering supplies of Kodak photographic materials to dealers.

An outstanding feature of the Bedford 10-cwt. Van is its bold modern styling, and this is seen to advantage in the picture on this page, which shows the Dinky Toy model of it in a typical setting. The Van is 3½" in length and is enamelled in a brilliant yellow. It carries Kodak transfers on its side panels, and the finely detailed modelling of the bonnet gives it a most pleasing and realistic appearance.

Dinky Toys collectors who are interested in making realistic layouts will note how a holiday atmosphere has been introduced in the picture by the inclusion of the hikers

gazing in the shop window, and by the indication of strong summer sunlight, which was achieved by placing the main lighting so that the sunblind cast a strong shadow over the window.

The 3-ton Army Wagon, Dinky Toys No. 621, represents one of the latest wagons in service with army units. It is based



Fig. 1. Dinky Toys No. 480, Bedford 10-cwt. Van "Kodak", photographed in a typical setting outside a photographer's shop.

on the popular Big Bedford chassis, and a glance at Fig. 3 will show how well the model displays the modern lines of these well-known lorries. The characteristic front end treatment of the Big Bedford lorries is carefully reproduced, with the radiator moulding clearly marked. A centrally-mounted spare wheel is carried underneath the chassis, as in actual practice, and the chassis detail includes



Fig. 2. The Dinky Toys 3-ton Army Wagon delivering supplies to a unit clothing stores.

in unloading the bales and crates.

Each of the realistic scenes illustrated in Figs. 1 and 2 can be made up quite easily and no great skill is required to produce a good effect. The materials required are readily available in practically every home, and consist of nothing more elaborate than a few pieces of cardboard from which to make the

mouldings of the fuel tank and a tool box on the off-side. As in the previous models in the Army series, the 3-ton Army Wagon carries Royal Armoured Corp transfers at the front and the rear. The die-cast body represents the all-metal design fitted to many Army vehicles, and the cord lacing for the cover is clearly marked. The cover is detachable.

This new Dinky Toy is sure to be one of the most popular models in the mechanised Army series owing to its true-to-life appearance and its suitability for use in games and play schemes of many kinds.

This type of wagon is ideally suited for Army service, for its high ground clearance makes it a versatile vehicle, almost equally at home over rough country as on the roads. It can therefore be used for a wide variety of purposes, from carrying men and equipment across country to performing the less spectacular, but none the less essential delivery duties necessary in every unit.

The scene in Fig. 2 shows the 3-ton Army Wagon engaged in one of the everyday tasks familiar to all service men. It has just arrived at a unit clothing stores with a fresh load of supplies, and a working party is engaged

in unloading the buildings, a suitable picture for a background, a box of water colour paints and a few Dinky Toys Miniature Figures. The sunblind at the photographer's shop in Fig. 1 is simply a piece of cardboard painted with brightly coloured stripes and glued in position over the window.

One of the most attractive features of making simple Dinky Toys layouts of this type is that the same materials can be used over and over again in assembling different settings. For example, the clothing store seen in Fig. 2 is the very building that was used for the garage scenes on pages 608 and 609 of the December 1953 *M.M.*, and as the Army vehicles workshop seen in Fig. 3 on page 285 of last month's *M.M.* A few slight alterations, such as a change of name on the front, were made to adapt it for its several uses.

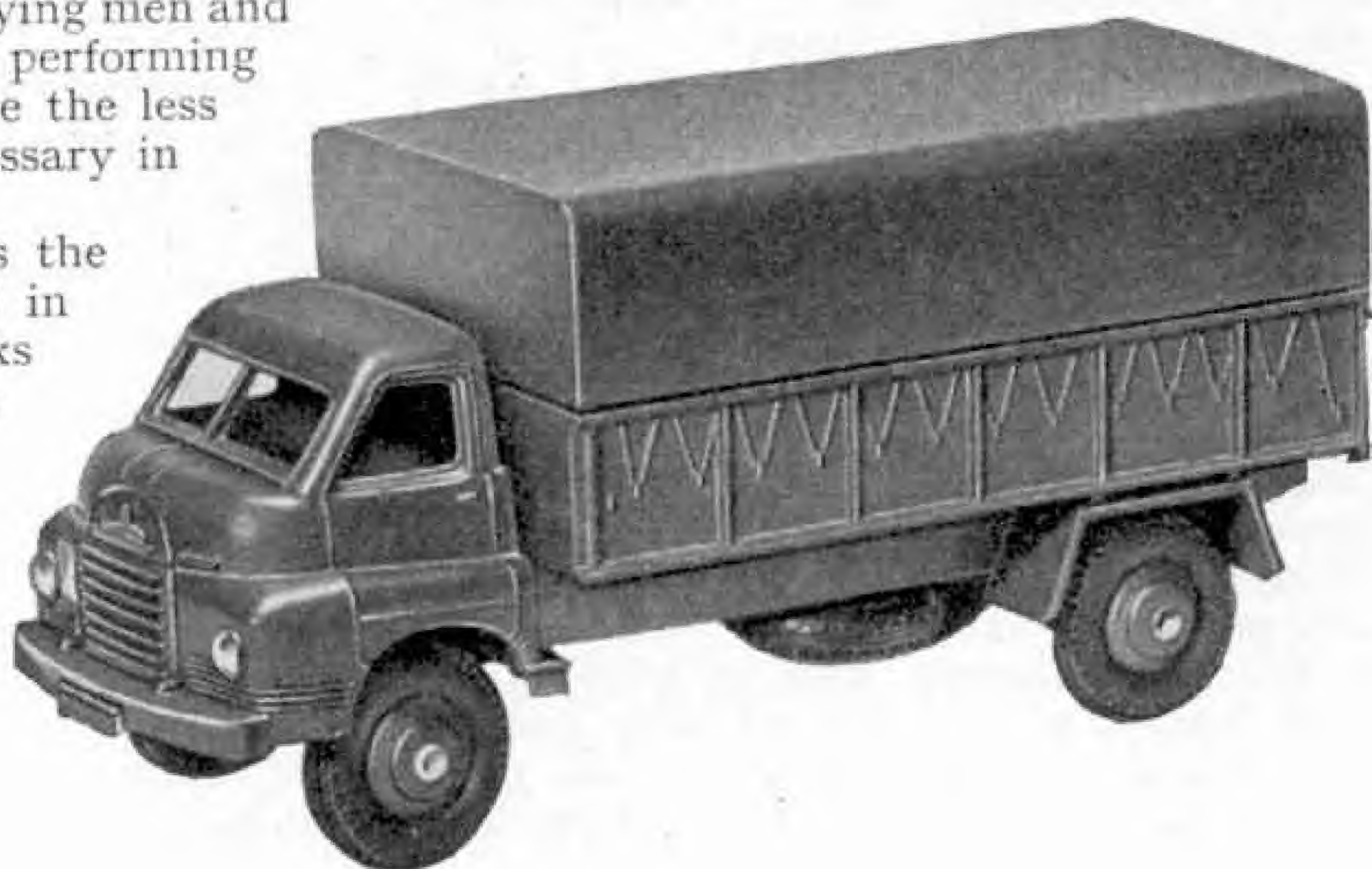


Fig. 3. Dinky Toys No. 621, 3-ton Army Wagon. Notice the fine details of cab front and body and the spare tyre.

Waterways Under the Hills

Stories of British Canal Tunnels

By C. P. and C. R. Weaver

IN a recent article appearing in these pages a description was given of a journey through Standedge Tunnel on the erstwhile London and North Western Railway. In this no mention was made of the canal tunnel that runs just below the railway and was actually in use when steam traction was but an imagination. We thought therefore that readers might be interested in a few details of this somewhat neglected, but none the less important, branch of our transport system. Our canal network

extremely slow and arduous. Teams of professional leggers operated in some tunnels, thus relieving the crew of this unwanted responsibility.

The longest canal tunnel is Standedge, 5,415 yards, carrying the summit level of the Huddersfield Narrow Canal through the Pennines between Diggle and Marsden. The engineer responsible for its construction was Benjamin Outram, the originator of tramways. It was begun in 1794 and was opened for traffic in 1800. Here the

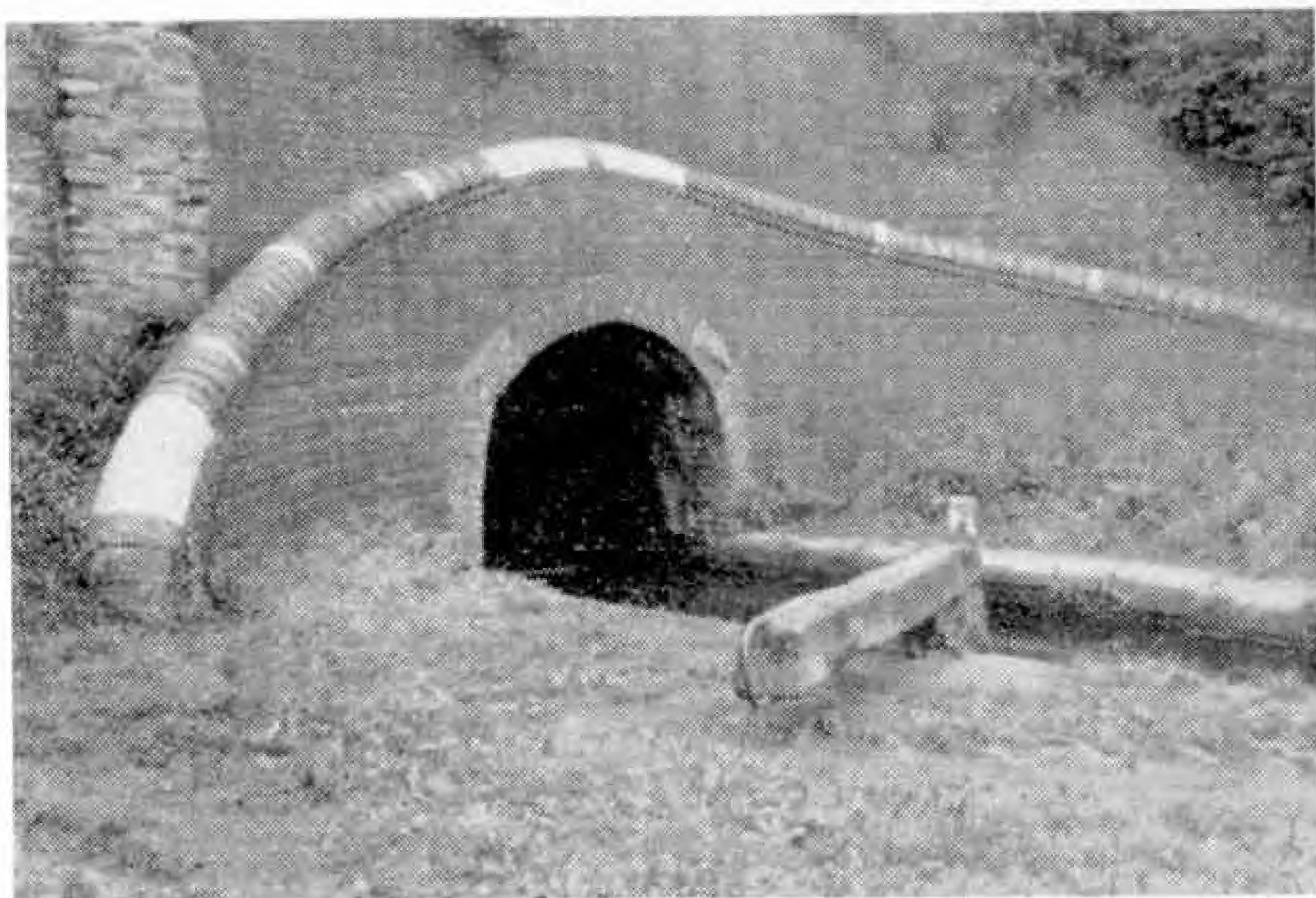
waterway is in places 660 ft. below the moors above. One air shaft alone is 600 ft. deep. The bore is in solid rock, and is therefore unlined and very restricted, having a height of only 8 ft. 6 in. and a width of 7 ft. 6 ins.

Boats navigating the canal were in the main "narrow" or "long" boats, as they were called, 70 ft. long and 7 ft. wide, and these could only pass in specially hewn bays which assume cavernous proportions. As the tunnel was a "legging" tunnel, through journeys occupied upwards of five hours. It had been in use for nearly 50 years before the railway

came along and was subsequently used by engineers when constructing the twin bores just above.

The canal is now abandoned as a commercial waterway and the flights of locks are rendered inoperative. The tunnel has to be maintained as a drainage channel, however, and is still navigable. British Waterways have a special craft for this purpose.

Our next longest tunnel is Sapperton, 3,817 yards, on the abandoned and derelict Thames and Severn Canal, the only Cotswold waterway. It was begun in 1784 and was finished in 1788. Both portals are in classic style and it is strange to come upon this long forgotten and deserted canal, set in the heart of the beautiful Cotswold beechwoods. It was the first large bore tunnel ever to be constructed in this



The north entrance of Dudley Tunnel, on the Dudley Canal. Its length is 3,172 yards and it is bored under the town of Dudley and its castle.

possesses a wealth of examples of historic, architectural and engineering magnitude, but in this short article we will deal with one feature alone—tunnels.

Tunnels were chosen by the early engineers as being the most economical and practical way of taking canals over (or through) watersheds, the alternative method of locking being wasteful in time, and expensive in provision of adequate water supplies. In the days before the introduction of power, barges were propelled through those tunnels not provided with tow paths either by "legging," in which men lay on their backs and pushed on the sides or roof with their feet, or by shafting, that is, pushing the boat along by the use of long wooden poles thrust against the bed of the canal or the tunnel wall. Both methods were



Steering the butty Uranus, which is being towed by the motor boat Columba in Braunston Tunnel, on the Grand Union Canal.

country and the events that occurred during its making read like a fairy story. Construction was difficult and it is amazing to see how these early engineers overcame their troubles—in parts a wooden channel was inserted to prevent leakage through the pervious strata. The tunnel suffered many roof falls even when in use, and quite recently three have occurred that have effectively sealed it.

To obtain photographic records of interesting sections before they are finally lost, we organised expeditions into its interior. Special lamp carriers were made to carry our accumulators and photographic equipment, as the water is still quite deep. A frog suit and a rubber dinghy were also used, for beyond the first roof fall, which is about $1\frac{1}{4}$ miles in, water has built up to a depth of 11 ft. and this had to be passed to reach the famous "Long Arching," the principal object of our expedition.

Lapal Tunnel, 3,795 yards, on the Dudley Canal, comes next in length. It is now unnavigable owing to mining subsidence. Also on this system are Dudley, 3,172 yards, and Netherton, 3,027 yards, both of very restricted dimensions. It is interesting to note that as an alternative to either legging or shafting, boats were assisted through by creating an artificial current, flowing in whichever direction was required.

Dudley Tunnel, bored under the town of Dudley and its castle, is in two sections, divided by an opening that in effect is part of a natural limestone cavern. Netherton Tunnel, constructed in 1856, is unique in that it is electrically lit and has a tow path on each side. Until quite recently the current for lighting was generated by water power, utilising the 20 ft. difference in levels of the Dudley and Birmingham Canals at its north eastern end. We have been through this tunnel in a horse drawn boat—it takes 35 min.—and we have also walked through, assisted by the light of an old oil lamp loaned us by the canal authorities, for the

electric lamps are spaced rather far apart.

On the Grand Union Canal, Birmingham to London main line, are Shrewley, 438 yards, Braunston, 2,042 yards, and Blisworth, 3,056 yards. We have been through all of these, either in our own boat, or as passengers on commercial craft. Blisworth is of interest in that it was the scene of a fatal accident, when the crew of a steam tug were suffocated by fumes. Thereafter adequate ventilation of all tunnels used by steam craft was made by



The southern end of West Hill Tunnel, on the Worcester and Birmingham Canal, is now just a ragged hole at the end of a picturesque tree-lined cutting.

opening up filled-in ventilation shafts. Here too, many years ago, was to be found an old "brushing boat" used to sweep the bore of accumulated soot in the days of

steam. Although one can see through Braunston Tunnel, care has to be taken when navigating owing to a "kink" near its eastern end.

Crick Tunnel, 1,528 yards, on the Leicester Section of the Grand Union, is reputed to be haunted. Our boat certainly behaved in a suspicious manner when we went through, but perhaps it was only our imagination, or the white swan we saw that regularly swims through in front of pursuing craft.

Harecastle on the Trent and Mersey Canal boasts two tunnels running side by side separated by only a few yards, but joined inside by the galleries of Golden Hill Colliery. The original bore was built by Brindley. It is of very restricted dimensions and is now completely derelict. Telford's later tunnel, 2,918 yards, was much more pretentious and boasted a towpath. Today the towpath has become unusable, and craft are towed through by an electric tug. The new bore has also been affected by subsidence, and craft passing through have to be ballasted to ensure adequate clearance.

Foulridge, 1,640 yards, on the summit of the Leeds and Liverpool Canal is interesting because it is on record that 40 years ago a cow swam through it! The

tunnel tug here also is worthy of mention, for it is or was powered by a Willans central valve compound steam engine and had a propeller and rudder at each end. Originally auxiliary air bottles were



The Oxford Canal at Fenny Compton is in a deep cutting formed by opening out the tunnel originally built there.

provided to assist the crew in breathing when conditions inside due to smoke made asphyxiation possible.

Tardebigge, 580 yards, and West Hill, 2,726 yards, on the Worcester and Birmingham Canal, were among the first tunnels we navigated in our own boat. The former is bored through solid rock, and is lined with brick only at certain points. The latter was either left unfinished owing to lack of funds, or has collapsed at some time, for the southern end is just a ragged hole at the end of a picturesque tree-lined cutting. Blue bricks for lining were made from the clay spoil, and burned in kilns set up on site. When we went through, our steering cable parted when about 400 yards inside and left us without helm. Luckily the boat had an auxiliary hand rudder and by leaning over the stern and to one side I could aim the bows at the far distant end. So we came through unscathed, although the course plotted was far from straight!

The Worcester and Birmingham is an interesting canal for many reasons. In addition to possessing the longest flight (Cont. on page 330)



The Bruce Tunnel at Savernake, on the Kennet and Avon Navigation. This has the largest cross-section of any British canal tunnel.



The Anglo-Iranian fire-fighting tug *Nirumand* shows her paces in a demonstration at Swansea.

DESPITE the many precautions taken nowadays to avert such a catastrophe, an outbreak of fire aboard a ship at sea is still one of the most serious hazards that mariners may encounter. Striking proof of this was the conflagration that destroyed the troopship *Empire Windrush* in March this year, and several similar disasters during the last 30 years or so also can be pointed out. The 42,512-ton *L'Atlantique*, the second largest liner in the French commercial fleet at the time, succumbed to fire in the English Channel in 1933, and the 11,520-ton *Morro Castle* was gutted during a pleasure cruise in 1934.

Although science and stringent regulations have now reduced the risk of such disasters in many ways, the hazards have actually increased in some directions. The ever-increasing demand for petroleum oil, for instance, has meant bigger tanker fleets, and such ships are especially vulnerable to fire.

A recent step to combat the menace was the re-equipping of a modern fire tug, the *Nirumand*, by the Anglo-Iranian Oil Company. She is now in commission at the oil terminal at Queen's Dock, Swansea, which serves Llandarcy Refinery with crude oil and provides outgoing cargoes of finished oil products.

Unlike most fire-fighting vessels, the *Nirumand* can deal with fires not only aboard ships in harbours or docks, but several miles offshore as well. Indeed, even before her official trials last January, she went out into the Bristol Channel to deal with a fire aboard the Admiralty auxiliary tanker *Wave Victory*. She fought

the blaze all night and into the following morning until it was extinguished.

The *Nirumand* was built in 1946 and saw service in the Middle East before going to Swansea. At the beginning of the present year she was completely re-equipped with the most up-to-date fire-fighting apparatus available, for her new role at the South Wales seaport. She is 112 ft. long, with a 30 ft. beam, and has a mean draught of slightly less than 13 ft. A 1,000 i.h.p. engine gives her a speed of 12 knots.

She can direct either water or foam mixture on to a fire, and two diesel pumps on deck, together

with a steam pump in the engine room, give a total water output of 3,900 gallons a minute, or more than 1,000 tons an hour. The maximum output of foam mixture is 9,800 gallons a minute, and the *Nirumand* carries enough foam concentrate to operate at this capacity for an hour!

The foam mixture is produced by four mechanical generators, each with a capacity of nearly 2,500 gallons a minute. It is made by mixing 14 gallons of foam concentrate with 350 gallons of water.

Eight gear-operated monitors are fitted above the navigation bridge, in such a position that they can be aimed in any direction. Four can be used at any one time.

Another tug of similar design, the *Zurmand*, has been similarly re-equipped and is now operating in connection with oil refineries on the Isle of Grain, Kent.

As to modern fire prevention, detection, and subduing on liners, ships like the *Queen Mary* are

(Continued on page 358)

Fire Fighting at Sea

By Arthur Turner

Air News

By John W. R. Taylor

"V"-Bombers for R.A.A.F.

The Australian Minister for Air, Mr. William McMahon, said recently that future plans of the Royal Australian Air Force include purchase from Britain of 24 "V"-bombers. He made no reference to the type of aircraft concerned; but the Vickers Valiant, illustrated on this page, would seem to be the obvious choice, as it is already coming off the production line, and is smaller and hence less costly than the Vulcan and Victor.

R.A.A.F. bomber squadrons are equipped at present with obsolete Lincoln piston-engined aircraft, but will soon begin to re-equip with Canberra jet bombers, built in the Australian Government aircraft factories at Fisherman's Bend, Port Melbourne.

Veteran for Air Museum

"Adaptable Annie," most famous of the 75 Boeing 247 twin-engined transports built between 1932 and 1935, has taken her place in American aviation's hall of fame—the National Air Museum.

First of the truly modern low-wing monoplane air liners, the 247 introduced such features as a retractable undercarriage, supercharged engines, automatic pilot and de-icing equipment. "Annie" herself visited England in 1934 for the great Mildenhall-to-Melbourne Air Race, in which she took third place. Afterwards she put in two years' service with United Air Lines, followed by a spell as executive transport for Union Electric Company. In 1939 she started work for the U.S. Government, first with the Air Safety Board and then as a "flying guinea pig" research plane with the Civil Aeronautics Administration. Now, as she takes her place beside the Wright Biplane and Bell X-1, first aircraft to fly faster than sound, the equipment she tested is making flying safer for all of us.

Clear Air Turbulence

Some rather frightening facts about air turbulence encountered during 300 test flights in clear air conditions at high altitudes have been reported by Mr. Eric Hyde, a Short test pilot. Flying Canberras and the Short SA.4 experimental bomber in clear sky above the highest cloud layer, Mr. Hyde and his colleagues have experienced turbulence varying from light, irregular buffeting—like riding over cobblestones—to violent displacement of the aircraft, such as would be experienced in cumulo-nimbus storm-clouds.

Even in the violent cases, the aircraft did not seem to drop more than 50 ft., but the "bumps" were very sudden, imposing heavy stresses on the aircraft. Occasionally, the instrument panel became unreadable, and in several instances control of the aircraft was difficult and tiring.

Japanese Air Force

Under pressure from the American Government, the Japanese have agreed to build up a tactical air force of 1,300 aircraft within three years. It will be the strongest air force in the Far East, equipped with 500 Sabre fighters, 100 twin-jet bombers (probably Martin-built Canberras), 100 Dakota transports and reconnaissance, liaison and training aircraft. The first 300 fighter pilots will be trained this year.

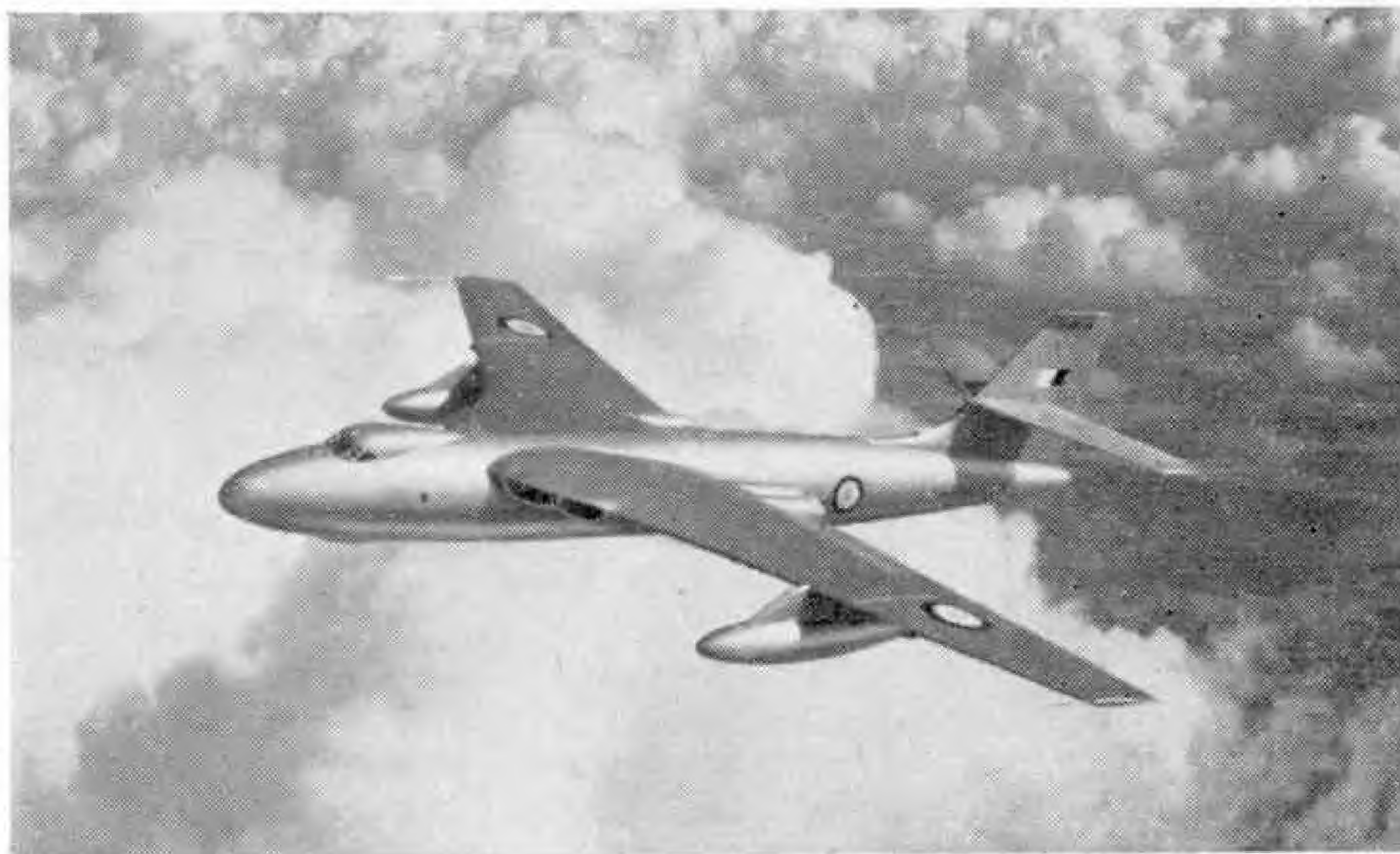
Mangoes, Mica and £1 Million of Oil

Among the unusual cargoes brought to London Airport this Spring by Air India International Constellations were many hundredweights of pure sandalwood oil, which is used in the manufacture of high quality soap and perfume. The oil is worth 70 shillings a pound; and Air India have already flown more than £1,000,000 worth to Britain.

Other items carried on the company's *Magic Carpet* service include ten tons of hog bristles each year for brushmaking and sewing shoes, five tons of mica for electrical equipment such as household electric irons, and as many as 24,000 "gift parcel" mangoes.

Swift and Hunter get New Guns

Fighter Command's Supermarine Swift and Hawker Hunter fighters are armed with a new type of British cannon—the 30 mm. Aden gun—which is capable of



Fine view of the Vickers Valiant B.1. This bomber has four Rolls-Royce Avon turbojets, and is here seen equipped with external fuel tanks, which greatly increase its range of operation.

inflicting "devastating damage" on enemy bombers. It gives about twice the rate-of-fire of the 600 rounds-per-minute 20 mm. Hispano cannon, which has been standard British fighter armament since 1941, and will enable the Hunter and Swift to hurl at their target eight times more high explosive each second than was possible with the earlier guns. The Aden was designed at the Ministry of Supply Armament Development Establishment, Enfield, and is used in conjunction with an advanced type of radar gun-sight and quick-acting fuse.

A Famous Battlefield from the Air

Every Sunday between 11 a.m. and 6 p.m., tourists can now view from the air by helicopter the famous battlefield of Waterloo, in Belgium. Special return flights are operated by Sabena from the base of the famous 130 ft. memorial mound surmounted by a lion, which was erected in 1826 in memory of the great battle. The helicopters used are the Sikorsky S.55s with which Sabena operate their pioneer international helicopter passenger services.



A technical discussion in progress at Onitsha, Nigeria, about one of the Hiller 360 helicopters being used in the search for oil in that country. Shell photograph.

Helicopters aid Oil Search

The first helicopters ever used by industry in Nigeria are aiding the search for oil in that country. They are two Hiller 360s, chartered by the Shell-D'Arcy Petroleum Development Company from Pest Control Ltd.

Fitted with either wheels or floats, they are performing invaluable work by lifting personnel and light equipment between the oil company's base camp and areas in which exploration is being undertaken. External detachable litters are available, to enable the helicopters to evacuate quickly any casualties that may occur; and, between times, they are used to spray the base camp at Owerri regularly with dieldrin, an effective weapon against malaria-carrying mosquitoes.

New British Engines to Fly

Three new British aero engines will be test-flown for the first time later this year. The first is a piston engine—the 870 h.p. Alvis Leonides Major—two of which are being fitted to the prototype Marathon 2, previously used to flight test two Mamba propeller-turbines.

The other two are built by Napier. One is the 3,000 h.p. Eland propeller-turbine, as specified for the Fairey Rotodyne helicopter, and which will be tested in a Vickers Varsity. The other is an important new version of the Nomad compound-engine, in which both piston and turbine engines are used to drive contra-rotating propellers. Its basic principle is that the gases for driving the turbine are produced by the highly-supercharged piston engine, an arrangement that gives exceptionally low fuel consumption. Two of these 3,135 h.p. Nomads will

be fitted in place of the normal outboard piston engines of a Shackleton patrol-bomber.

The Beechcraft Twin Bonanza

After five years of thorough testing, while its makers have been busy on military aircraft production, the neat six-seat Beechcraft Twin Bonanza is now in full production, and well over 100 are scheduled for delivery this year. Some are, of course, already in service with the U.S. Army as L-23A communications aircraft.

French Fighter Undercarriage Research

The French are continuing their tests to make fighter aircraft independent of long concrete runways. The undercarriageless S.E. Baroudeur jet fighter has been launched successfully from a wheeled trolley on rough grass, and has taken off and landed from smooth grass and a beach on its small retractable skids. Now the 140th production Dassault Ouragan fighter has been fitted with small "diabolos"

carrying low-pressure tyres instead of its usual large main wheels. They enable it to operate from ordinary fields, a tail parachute being fitted to reduce landing speed.

* * *

As a result of the success of their "Colonial Coach" cheap-fare *Safari* services from Britain to East Africa, the Sudan and Rhodesia, Airwork Ltd. and Hunting-Clan Air Transport Ltd. last month started a new *Safari* service to West Africa. It is being operated once-weekly in each direction with 27-seat Viking aircraft, flown alternately by each airline. The route is Bovingdon (Hunting) or Blackbushe (Airwork), Bordeaux, Tangier, Agadir, Villa Cisneros, Dakar, Bathurst, Freetown, Robertsfield (or Abidjan), Takoradi and Accra, with night stops at Tangier and Dakar.

B.E.A. Progress

According to Mr. Peter Masefield, Chief Executive of B.E.A., this airline is the biggest operator out of London Airport, judged by numbers of aircraft movements and passengers carried. But this is only a start, and by the summer of 1955 B.E.A. expect to have as many air liners flying in and out of London Airport as all the other airlines put together.



The Beechcraft B.50 Twin Bonanza six-seater transport aircraft referred to on this page. Photograph by courtesy of Beech Aircraft Corporation, U.S.A.

Among the Model-Builders

By "Spanner"

Variable Ratchet Feed

Some engineers' machines, such as planers and shapers, make use of ratchet mechanisms for operating the feeding action of the cutting tool or for traversing the work table. Sometimes it is desirable to have available means of varying the stroke of the ratchet, so that the rate of feed can be altered to suit the kind of finish required or the metal being worked. The Meccano mechanism shown in Fig. 1 represents one method of varying the rate of feed simply by turning a handwheel.

The driving shaft is fitted with a Bush Wheel to which a 5½" Strip is lock-nutted. To the other end of this Strip two 2" Strips 2 and 3 are pivoted freely on a lock-nutted bolt, and the Strip 3 is lock-nutted also to a 1" Triangular Plate bolted to a 2" Strip 4. The Strip 4 pivots on the driven shaft, between a Collar and two 57-tooth Gears 5, which are fixed face to face on the shaft with their teeth exactly in line. A Pawl 6 is mounted freely on a Pivot Bolt held by its nuts in the end hole of the Strip 4 and in the



At three years of age, Phillip Smedley, Hillsborough, shows signs of becoming an excellent model-builder. This picture is by Mr. E. A. Campbell, Stoke-on-Trent.

Triangular Plate. The Pawl engages the teeth of the Gears 5, and is held against them by a Driving Band looped between

a bolt screwed into the boss of the Pawl and the bolt that fixes the Triangular Plate to the Strip 4.

A second Pawl 7 is pivoted on a ¾" Bolt that is held in the frame by two nuts. This Pawl is spaced on the Bolt by Washers and engages the teeth of the Gears 5. The Pawl 7 is held against the Gears by a Driving Band.

A bolt is passed through the end hole of Strip 2,

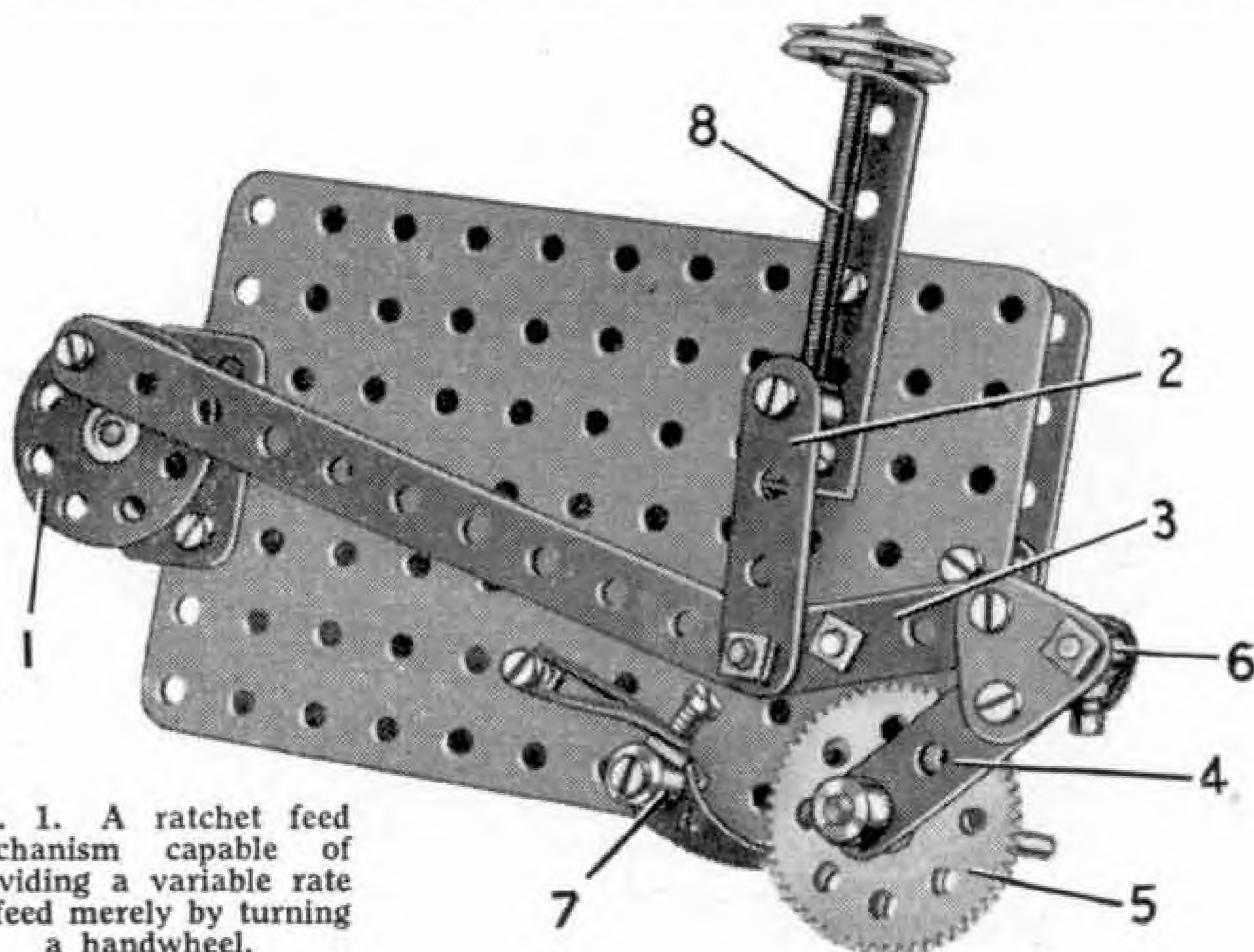
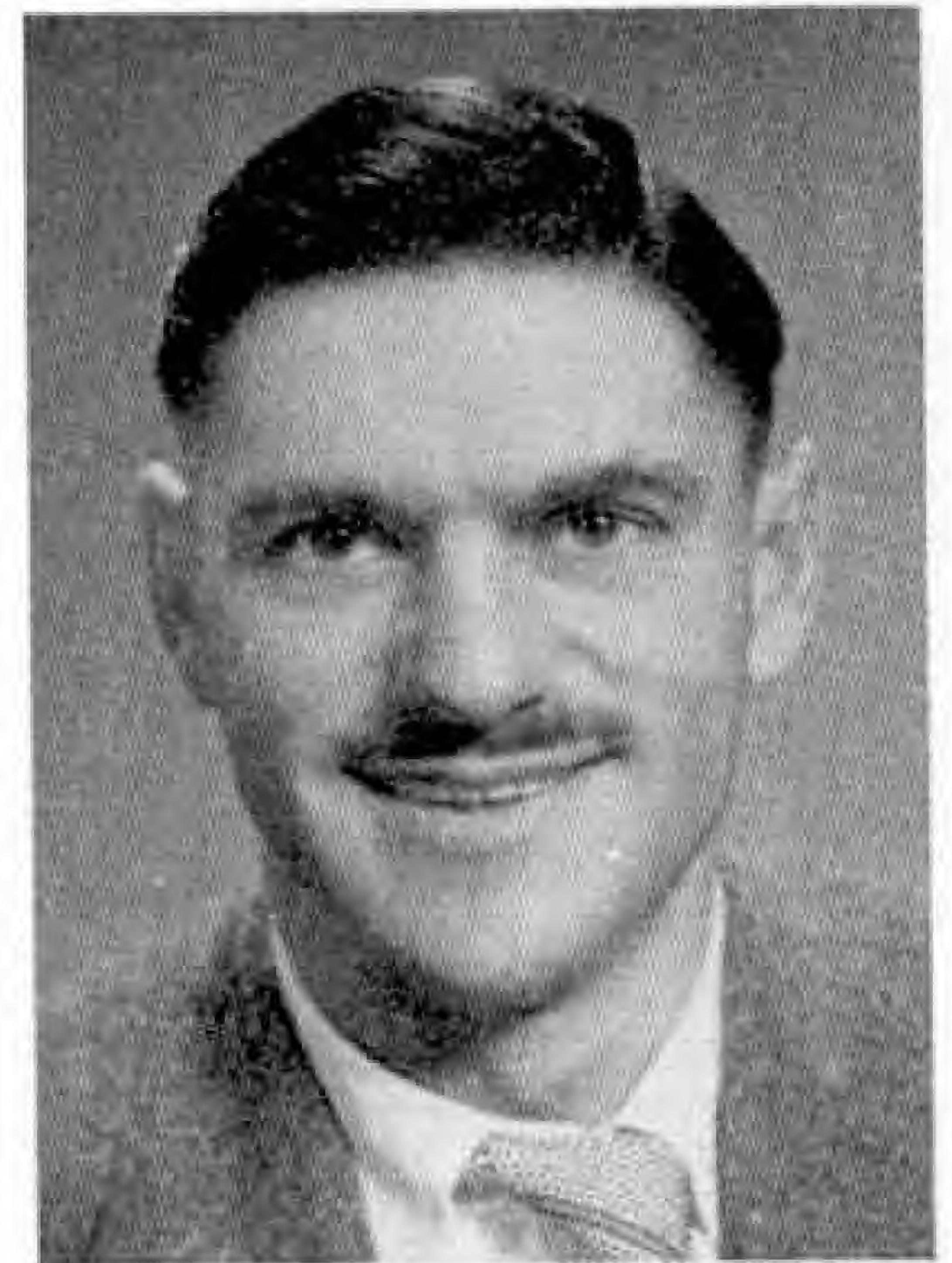


Fig. 1. A ratchet feed mechanism capable of providing a variable rate of feed merely by turning a handwheel.



This smiling prize-winner is Philip Gay, East Harptree, Bristol. He was one of the lucky competitors in the International Model-Building Competition.



One of the older generation of Meccano enthusiasts, Mr. S. M. Bernstein, Cape Town, who has contributed successful entries to Meccano competitions.

fitted with a nut and is then screwed into a Threaded Boss. The nut is tightened against the Threaded Boss, which is screwed on to a 3" Screwed Rod 8.

Independent Front Suspension

In the neat independent front suspension shown in Fig. 2, the beam that supports the suspension links is made from two 3½" Strips 1, joined by two Double Brackets. Each Strip is fitted with a Flat Trunnion, to which two 3" Strips 2 are lock-nutted.

The upper links on each side are made from a 1½" Strip 3 and a Bell Crank 4 spaced apart by nuts on ½" Bolts 5. The Strips 2 on each side are also connected by ½" Bolts. The Couplings 6 are mounted freely on 1½" Rods gripped in Collars placed one above and one below each Coupling 6. The upper Collar is pivoted on bolts passed through the Strip 3 and an arm of the Bell Crank 4. The lower Collar pivots on bolts in Strips 2. A Spring 7 is attached as shown to the Bell Cranks.

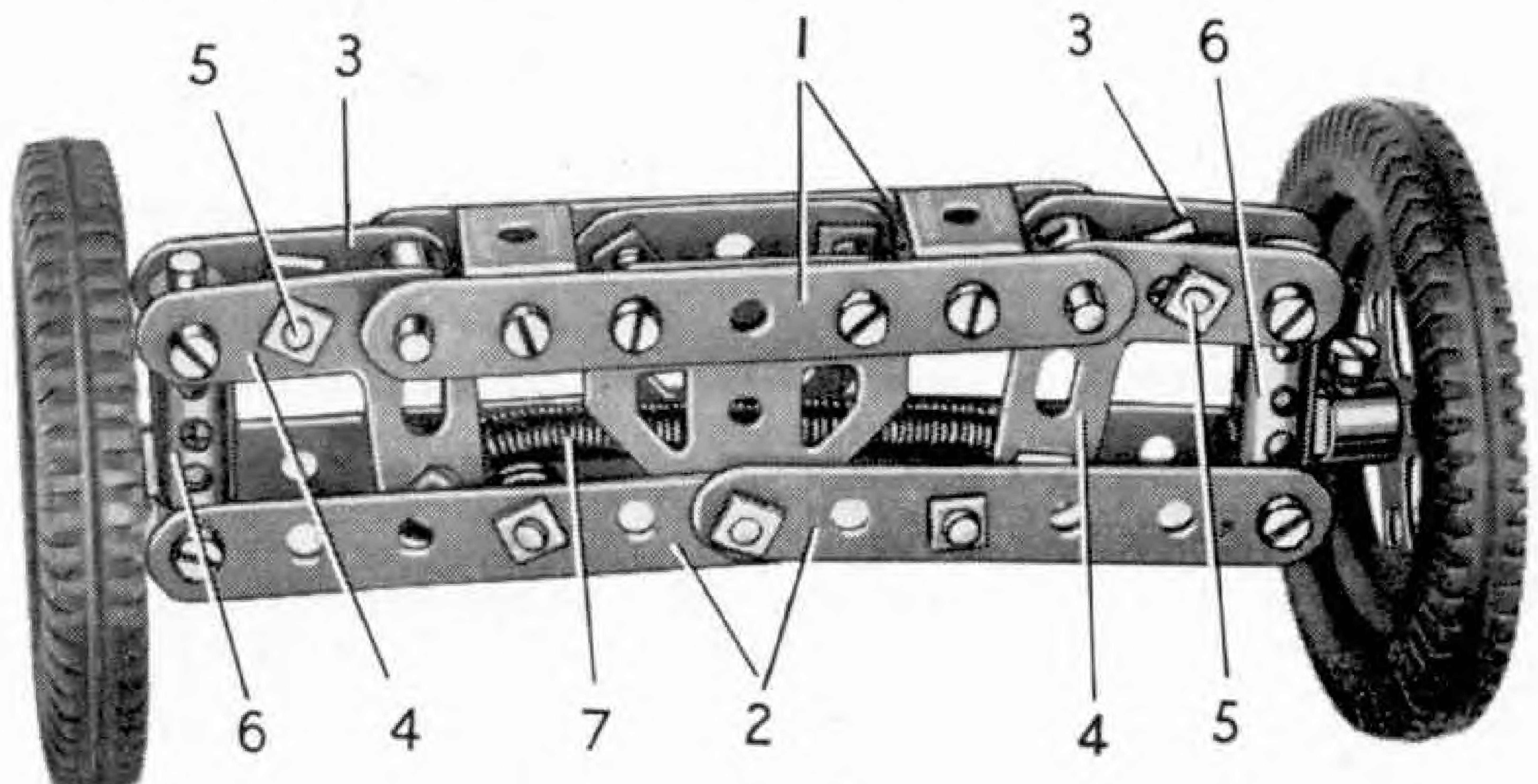
A Meccano Brain Teaser

A Prize for the Best Solution

Here is a problem for Meccano mechanism enthusiasts. Suppose you were building a special model in which it was necessary to drive two shafts arranged in line with each other, the two to turn in opposite directions. If you had gears available the task would offer no difficulty, but for the purpose of this problem you are asked to suppose that all your gears and Pulleys had been used up elsewhere in the model, and you are now faced with the task of driving these two shafts in opposite directions by some other means. Can you solve the problem? There are ways of obtaining the result required without using gearing of any kind, and I wonder if you can discover them.

The Editor will award a prize of £1/1/- to the reader who sends in the best solution, in the form of a photograph or a sketch, before 31st July. Address your letters containing solutions to "Spanner," *Meccano Magazine*, Binns Road, Liverpool 13.

Fig. 2. A neat form of independent front suspension with good springing action.



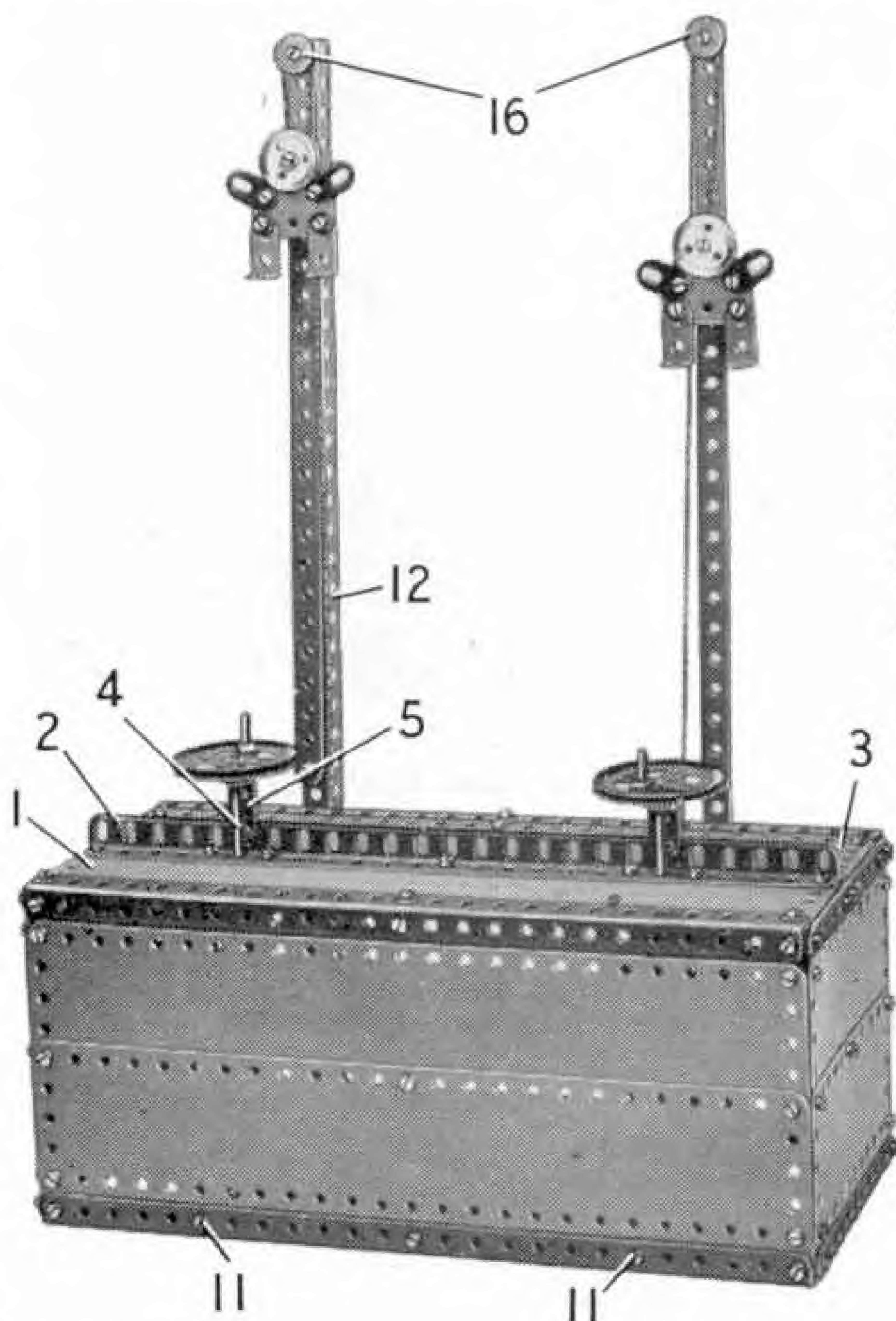


Fig. 1. The Climbing Monkeys. This novel race game will provide lots of fun for you and your friends.

MOST of us wish to spend as much time as possible outdoors during the all too brief months of summer. But there are occasions when weather conditions prevent us from enjoying outdoor sports and pastimes, and it is then that our Meccano Outfits come to the rescue and provide the means of passing away a few pleasant hours. It is with such occasions in mind that I have chosen the subjects for this month's new models.

The first of these provides a complete change from the more serious type of model-building, as it is based on one of the many exciting amusement machines found in most pleasure parks and fairgrounds. It consists of two "monkeys" which are arranged so that by turning handles they can be made to climb up a tall column. Each monkey is operated independently of the other by a separate handle, so that you and your pal can have a great deal of fun, each trying to make his monkey reach the top first.

Beware, however! There is a catch in

New Meccano Models

Climbing Monkeys—Sports Car

it! It is not necessarily the one who turns his handle fastest that wins! Indeed speed of turning can lead to failure and the tortoise may come in first after all! This is due to an ingenious method of driving the climbing mechanism used in the model, and it is this feature that provides the fun!

The front and rear sides of the base each consist of two $12\frac{1}{2}$ " Angle Girders connected at their ends by $5\frac{1}{2}$ " Angle Girders. You will need two $5\frac{1}{2}$ " Strips and two $5\frac{1}{2} \times 2\frac{1}{2}$ " Flexible Plates for each end of the base. Fill in the front with two $12\frac{1}{2} \times 2\frac{1}{2}$ " Strip Plates. Then bolt a $12\frac{1}{2} \times 2\frac{1}{2}$ " Strip Plate 1 to the top of the base, and brace it with a $12\frac{1}{2}$ " Angle Girder 2 connected to the ends by Angle Brackets. Now bolt another $12\frac{1}{2} \times 2\frac{1}{2}$ " Strip Plate 3 to $2\frac{1}{2}$ " Angle Girders fixed to the ends, and brace it at the centre with a $3\frac{1}{2}$ " Strip.

The mechanisms operating the "monkeys" are exactly the same in construction. Pass a $4\frac{1}{2}$ " Rod 4 through a $1 \times \frac{1}{2}$ " Angle Bracket 5 bolted to the Girder 2, then through the Girder and through a Double Bent Strip 6. Fix a Bush Wheel 7 to the Rod, and to it pivot two $1\frac{1}{2}$ " Strips on bolts lock-nutted to Angle Brackets bolted to the Bush Wheel. Connect each Strip to a further $1\frac{1}{2}$ " Strip 8 by a 1" Rod, and fix a 1" Pulley at each end of the Rod. Pivot the lower ends of the Strips 8 to a Double Arm Crank 9 by a bolt.

Pass the bolt through the end holes of Strips 8 and fit it with a nut. Then screw the bolt into one of the tapped holes in the boss of the Double Arm Crank, and tighten a nut against the boss. This construction connects the Strips 8 to the Double Arm Crank, but leaves it free to slide on Rod 4. A simple governor is formed by bolting an Angle Bracket 10 to one end of the Double Arm Crank.

Now fix a $5\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip between the sides of the base by means of the bolts marked 11, and attach to the back a vertical $18\frac{1}{2}$ " Angle Girder 12.

Fig. 2. The interior of the base of the Climbing Monkeys model, showing one of the two driving mechanisms.

Mount a 2" Rod 13 in the Double Angle Strip and in a 1" Reversed Angle Bracket 14 bolted to it. Fit the Rod with a Bush Wheel 15, and arrange a Collar below the Double Angle Strip to hold it in position. In the Bush Wheel fix a bolt.

To make the body of each monkey use a Flat Trunnion. The arms and legs are Fishplates and 1" \times $\frac{1}{2}$ " Angle Brackets respectively. Each head is a 1" loose Pulley, and a $\frac{3}{8}$ " Bolt is passed through the Pulley and the Flat Trunnion, and is fixed in the boss of a Slide Piece. Pass the Slide Piece over a 12 $\frac{1}{2}$ " Strip attached to the Girder 12 by a $\frac{3}{8}$ " Bolt at its lower end, but space the Strip from the Girder by two nuts on the Bolt.

Tie a length of thin cord to the Slide Piece, and then take it over the $\frac{1}{2}$ " loose Pulley 16. This Pulley is mounted freely on a $\frac{3}{4}$ " Bolt gripped in the 12 $\frac{1}{2}$ " Strip by two nuts, and attached also to the top of Girder 12 by two nuts. Pass the cord through the base then round a $\frac{1}{2}$ " loose Pulley 17 and tie it to Rod 13. Arrange the $\frac{1}{2}$ " Pulley so that it is free to turn on a $\frac{3}{8}$ " Bolt lock-nutted to an Angle Bracket, and bolt the Angle Bracket to the 5 $\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip.

Now if you turn the Rod 4 slowly the Angle Bracket 10 will engage the bolt in the Bush Wheel 15, so that the cord

will be wound on Rod 13 and the "monkey" will start to climb. As you increase the speed of Rod 4 the governor will come into operation and raise the Angle Bracket clear of the bolt. The cord will then unwind and the "monkey" will fall.

The parts you will need to build the Climbing Monkeys are as follows: 2 of No. 1; 5 of No. 2; 1 of No. 3; 8 of No. 6a; 2 of No. 7a; 5 of No. 8; 4 of No. 9; 2 of No. 9d; 4 of No. 10; 10 of No. 12; 6 of No. 12b; 2 of No. 15a; 2 of No. 17; 4 of No. 18b; 2 of No. 20a; 8 of No. 22; 2 of No. 22a; 2 of No. 23; 4 of No. 24; 93 of No. 37; 21 of No. 37a; 30 of No. 38; 2 of No. 45; 2 of No. 48d; 2 of No. 50; 2 of No. 59; 2 of No. 62b; 2 of No. 111; 6 of No. 111c; 2 of No. 115; 2 of No. 124; 2 of No. 126a; 4 of No. 192; 4 of No. 197.

Now I come to a simple little model of a sports car, which is specially designed for those who own only an Outfit No. 0. It is shown in Fig. 3.

To build this simple model take two Trunnions and bolt them to two 5 $\frac{1}{2}$ " Strips 2. One of the Trunnions is marked 1 in the illustration.

(Continued on page 358)

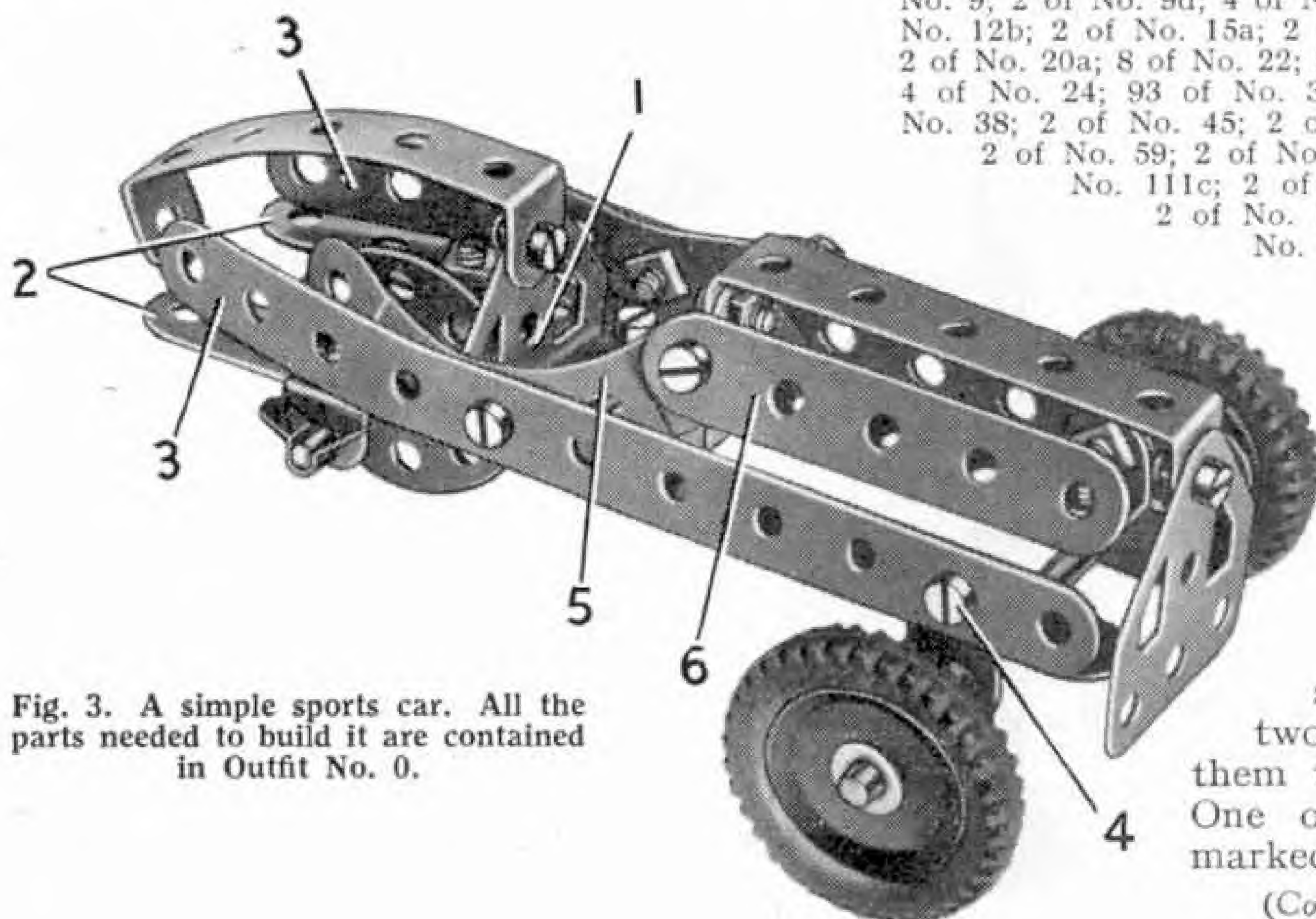
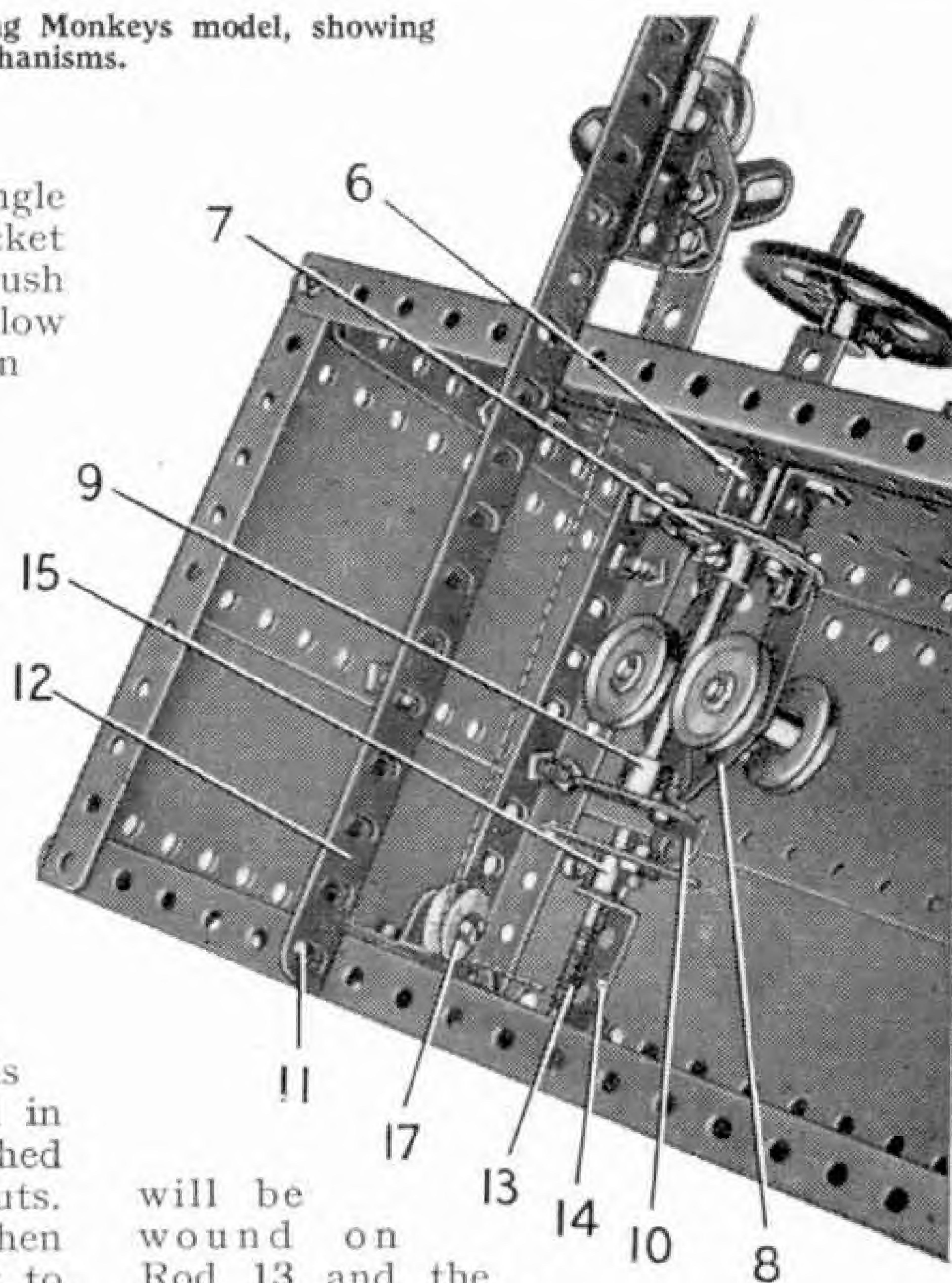


Fig. 3. A simple sports car. All the parts needed to build it are contained in Outfit No. 0.

"Simplicity" Model-Building Contest

Still Time to Win a Prize

ENTRIES are now pouring in for the Simplicity Model-Building Competition, in which fine Cash Prizes are offered for the best models of any kind built from a few Meccano parts. Readers who have not yet sent in *their* entries, however, will be glad to know that they can still do so provided that they hurry. The Contest closes on 31st July so that there is no time to waste.

In building models for this Contest you are not restricted to any specified number

thing to do is to choose a suitable subject and then try to model it realistically with as few Meccano parts as possible. Two splendid examples of simplicity models of this kind are shown on this page.

When you have completed your model you should obtain either a photograph or a good drawing of it. You should then write your age, name and address on the back of the illustration and send it to "*Simplicity Model-Building Contest, Meccano Ltd.,*

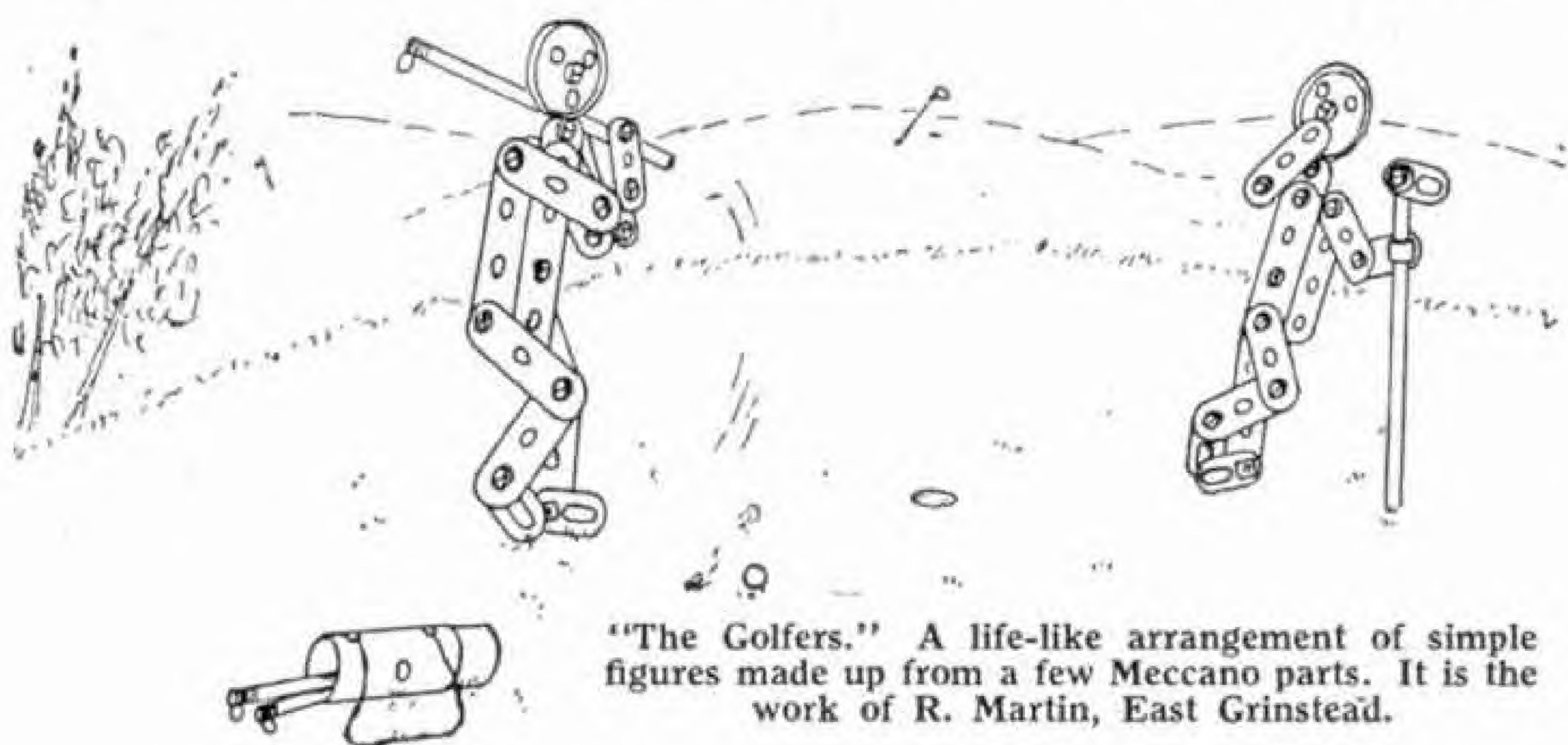
Binns Road, Liverpool 13."

The actual model must not be sent.

The Competition will be divided into two Sections: A, for readers under 14 years of age, and B, for readers over 14 years of age. The closing date is 31st July next.

The Prizes to be awarded in each Section of the

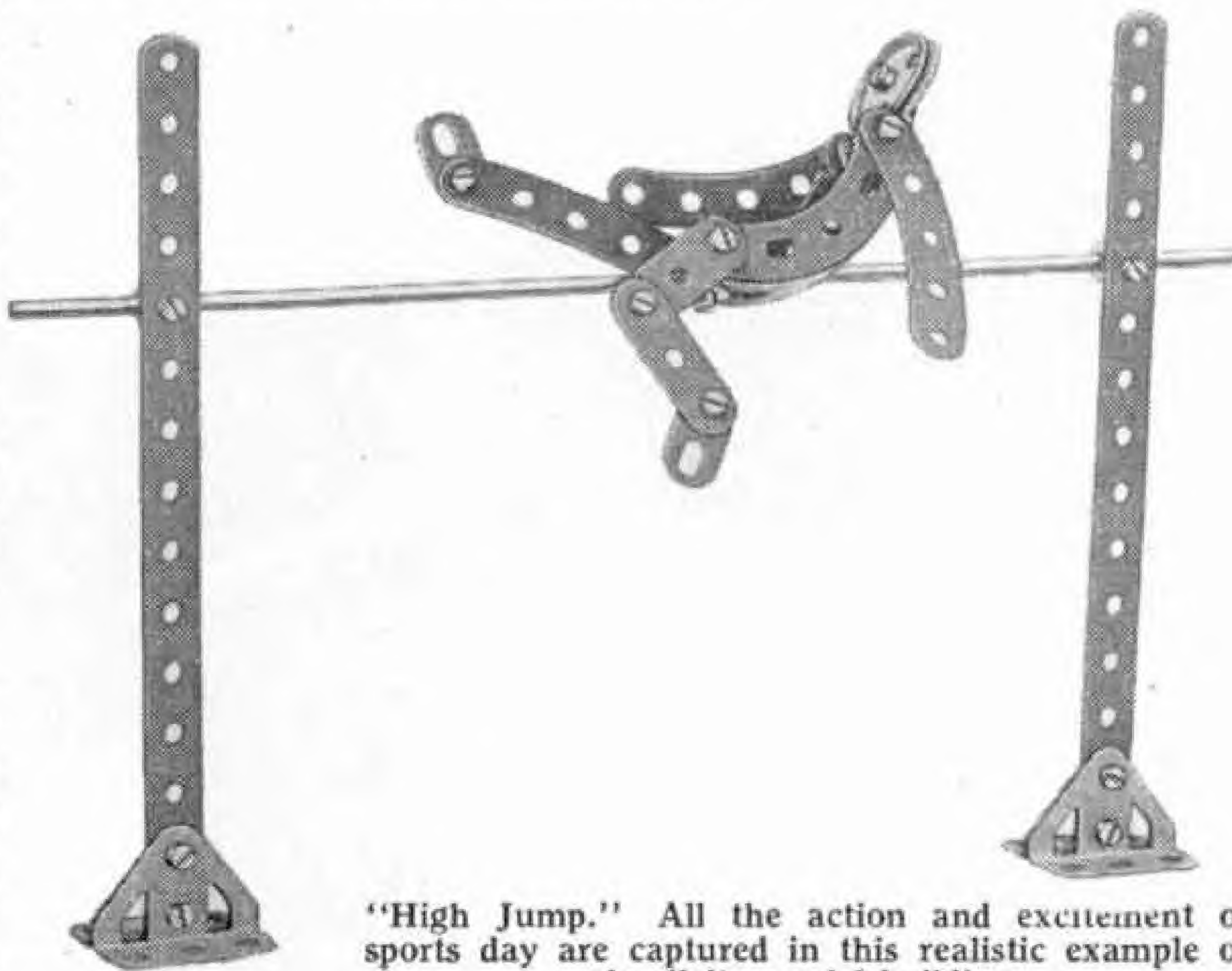
Competition are as follows: First, Cheque for £3/3/-. Second, Cheque for £2/2/-. Third, Cheque for £1/1/-. There will be also Ten Prizes each of 10/-, and Ten Prizes each of 5/-.



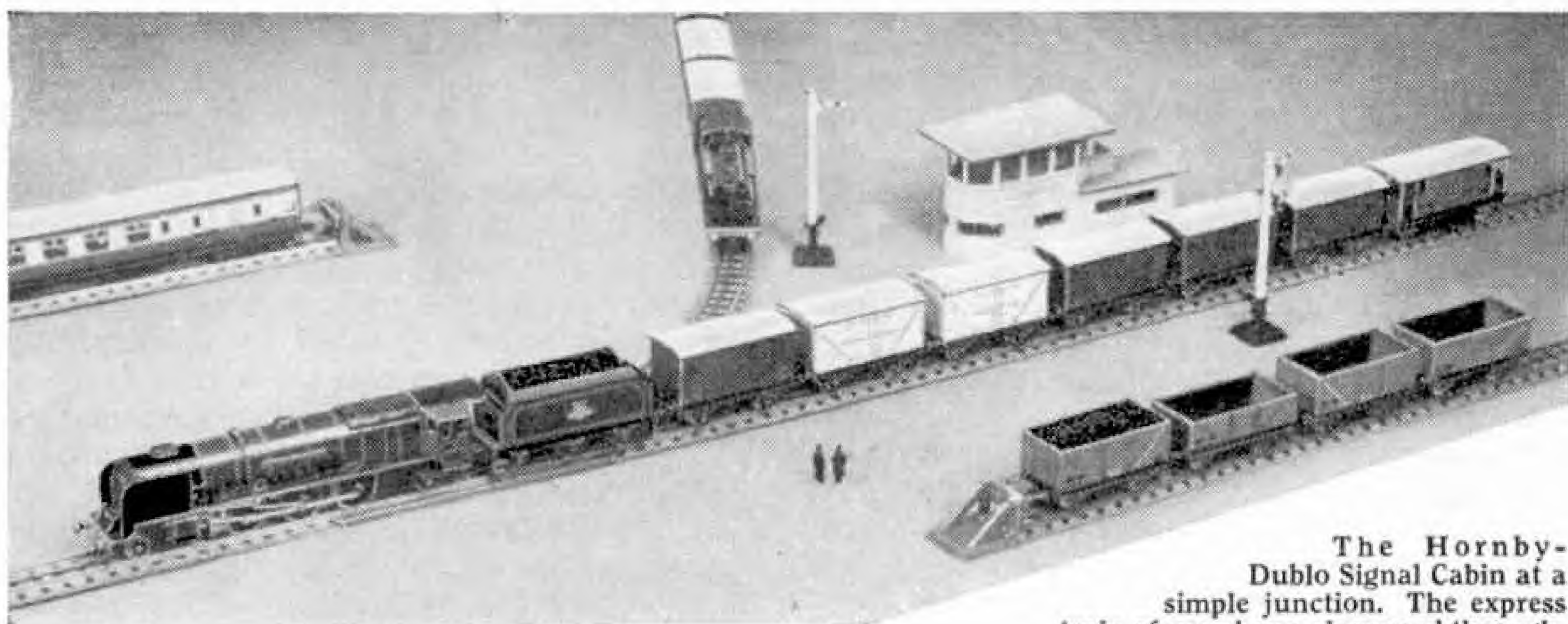
"The Golfers." A life-like arrangement of simple figures made up from a few Meccano parts. It is the work of R. Martin, East Grinstead.

of parts. You may use any number or variety of parts that you wish, but you should bear in mind that the prizes will be awarded to those competitors who succeed in building the most ingenious and realistic models with the *smallest number of parts*. It will be seen therefore that this Contest is not for owners of small Outfits only, as it is possible to use in the construction of simple models many Meccano parts such as Cranks, Gear Wheels, Couplings, etc., that are not to be found in the smaller Outfits. The competitor who submits the *smallest* model will not necessarily obtain the First Prize.

It is possible, of course, to bolt together two or three Strips, Trunnions and other parts and call the finished structure a car or an aeroplane, but such a model would have little chance of obtaining a prize! The first



"High Jump." All the action and excitement of sports day are captured in this realistic example of simplicity model-building.



The Hornby-Dublo Signal Cabin at a simple junction. The express train of vans has a clear road through.

HORNBY RAILWAY COMPANY

By the Secretary

The Box

THE Box? You know it well enough. To most of us who sit in trains it is the Signal Cabin, but to railwaymen it is always just "the box." There are plenty of "boxes" on real railways. On almost any journey by rail we are bound to pass a succession of them, and of course we must have at least one on any Hornby-Dublo line. They house the apparatus for working points, signals, and so on, and the job of the signalmen whom we see in them, looking closely at our trains as we pass, is to ensure our safe passage through their sections.

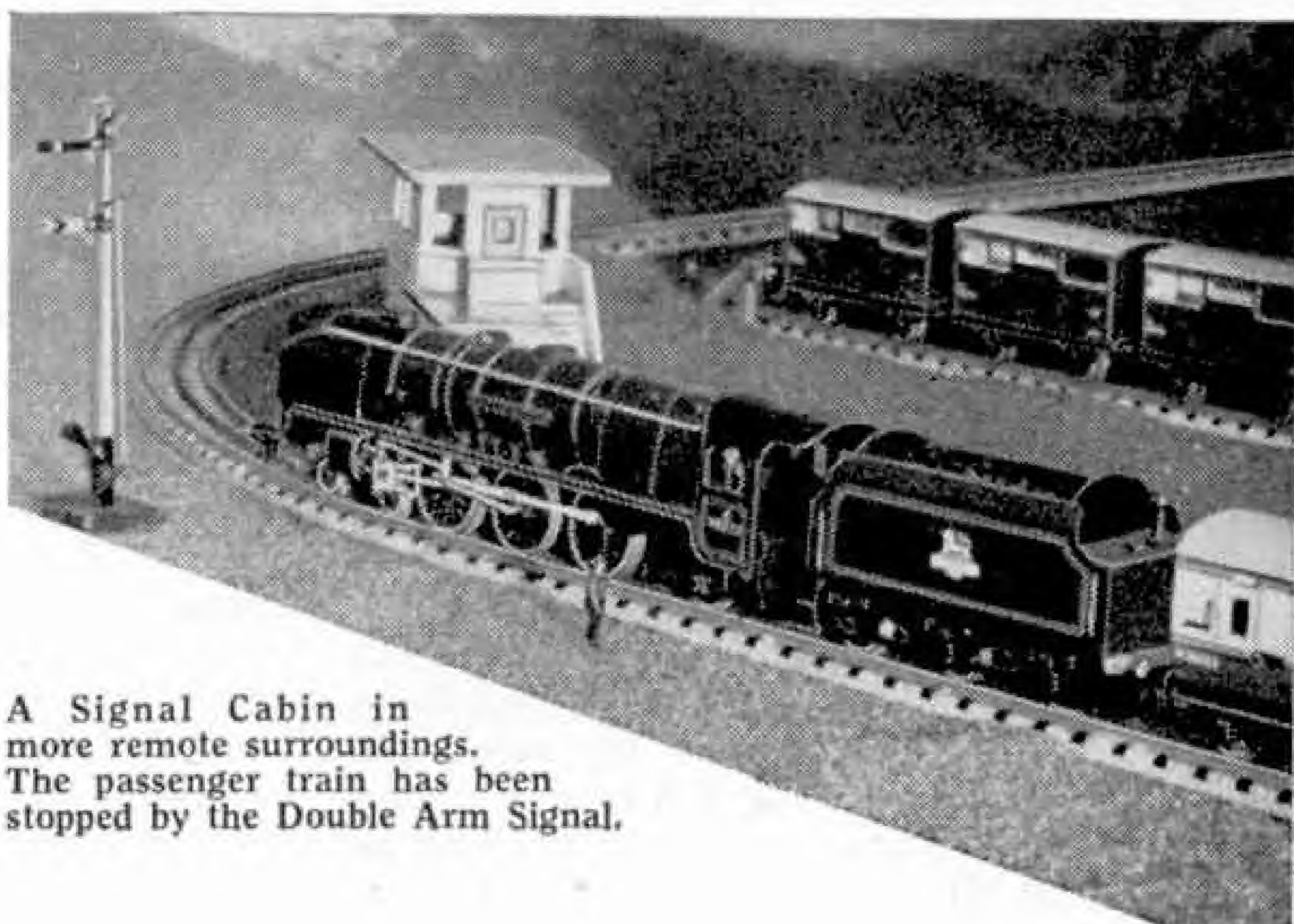
The Hornby-Dublo Signal Cabin is of medium size so that it suits conditions on the average Hornby-Dublo layout. It is representative of modern style, with its projecting roof and angled windows at each end. There is no need for me to go into a great deal of detail regarding the building itself, because most of you will have at least one on your layout.

As with many modern boxes, the operating floor covers less space than that needed to house the apparatus, and the batteries and relays required in connection with track circuiting and power signalling. Thus the battery "house" projects, as it were, from the main building, and part of its roof forms an effective landing in

front of the door leading to the operating floor. This landing, which is reached by the usual stairway, makes a very good place to pop a miniature figure to represent a signalman or some other railwayman.

The placing of the Signal Cabin is something that requires a certain amount of attention. Naturally one should be put at or near your Station, and a shunting yard too requires a box, which must give a good view of the yard tracks and of the main line connection. Another place near which a Signal Cabin can be placed realistically is at a branch line junction, where traffic control obviously is necessary.

The actual signalling arrangements are simple and I will have something to say about them another time.



A Signal Cabin in more remote surroundings. The passenger train has been stopped by the Double Arm Signal.

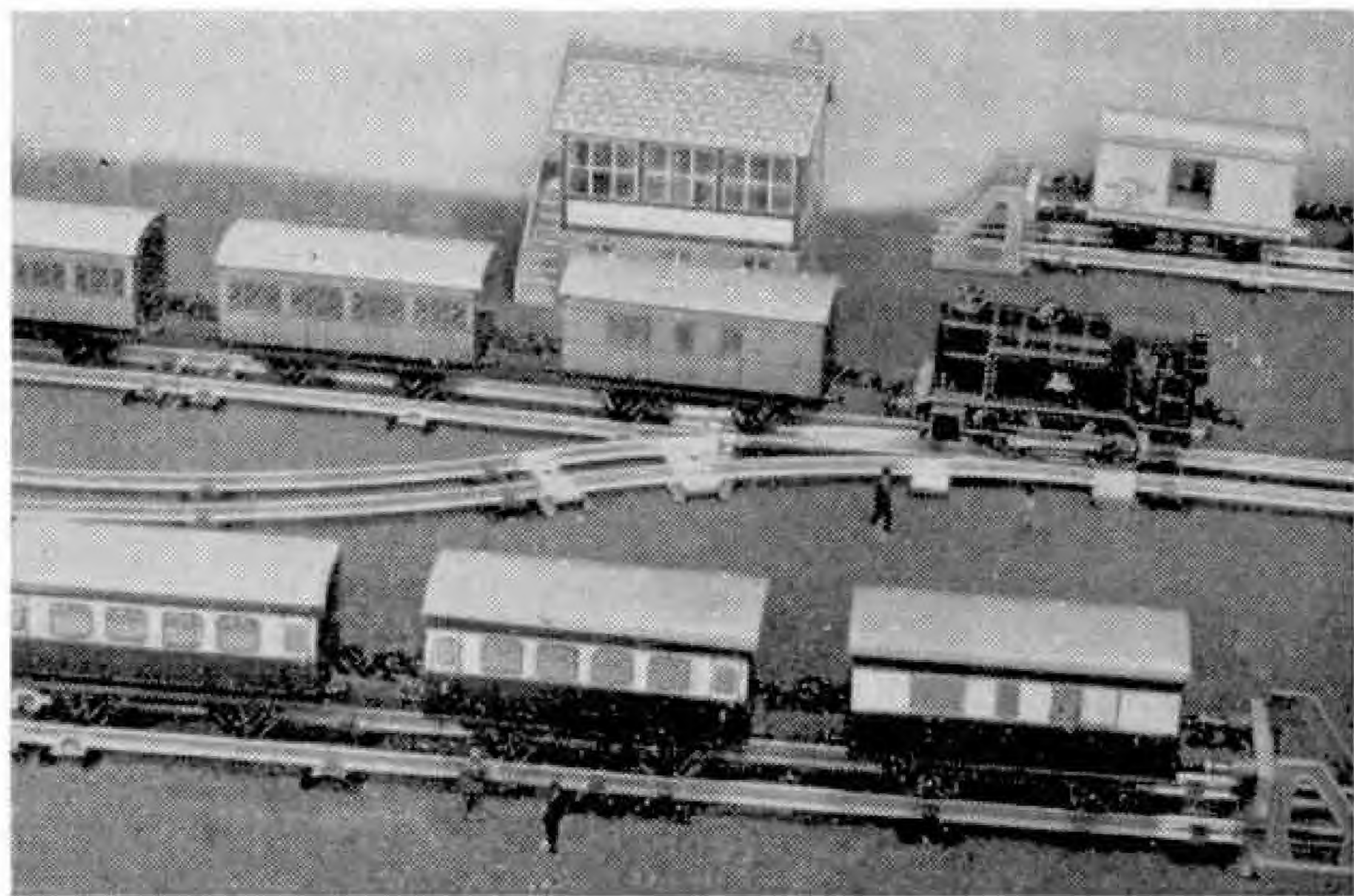
Busy Days on Hornby Railways

THIS is a busy time of the year on real railways and very often this leads to increased activity on miniature layouts. This year at least there is little doubt that the production of Hornby trains in B.R. colours has given a new interest to train running on many systems.

On layouts that were already provided with equipment in "company" liveries, the addition of B.R. stock has provided more variety and this adds to the interest of our train running. Of course in real practice B.R. Standard locomotives and their

miniature railway practice. On a large layout we may have two or more trains, and if these are kept ready made up in a standard formation they will resemble the set trains normally used in maintaining intensive local services. For this type of job the Hornby No. 40 Tank Locomotive and the No. 41 Passenger Coaches and Brake Vans, of course in B.R. colours, are just what we require. In fact, this Hornby engine carries an 82XXX number and the same power classification—"3"—as the B.R. Standards referred to previously.

Again, there are plenty of possibilities in the running of main line express trains, now that corridor type vehicles are represented in the Hornby System. These are the No. 51 Passenger Coaches and Brake Vans, of the same four-wheeled type so suitable for the average Hornby Gauge 0 layout and engines of the system. They are included in the Hornby 51 Passenger Train Set, but they can also be obtained separately, so that the enthusiastic Traffic Manager does not have to be restricted to the vehicles contained in his Set. He can buy further Coaches, if he wants them,



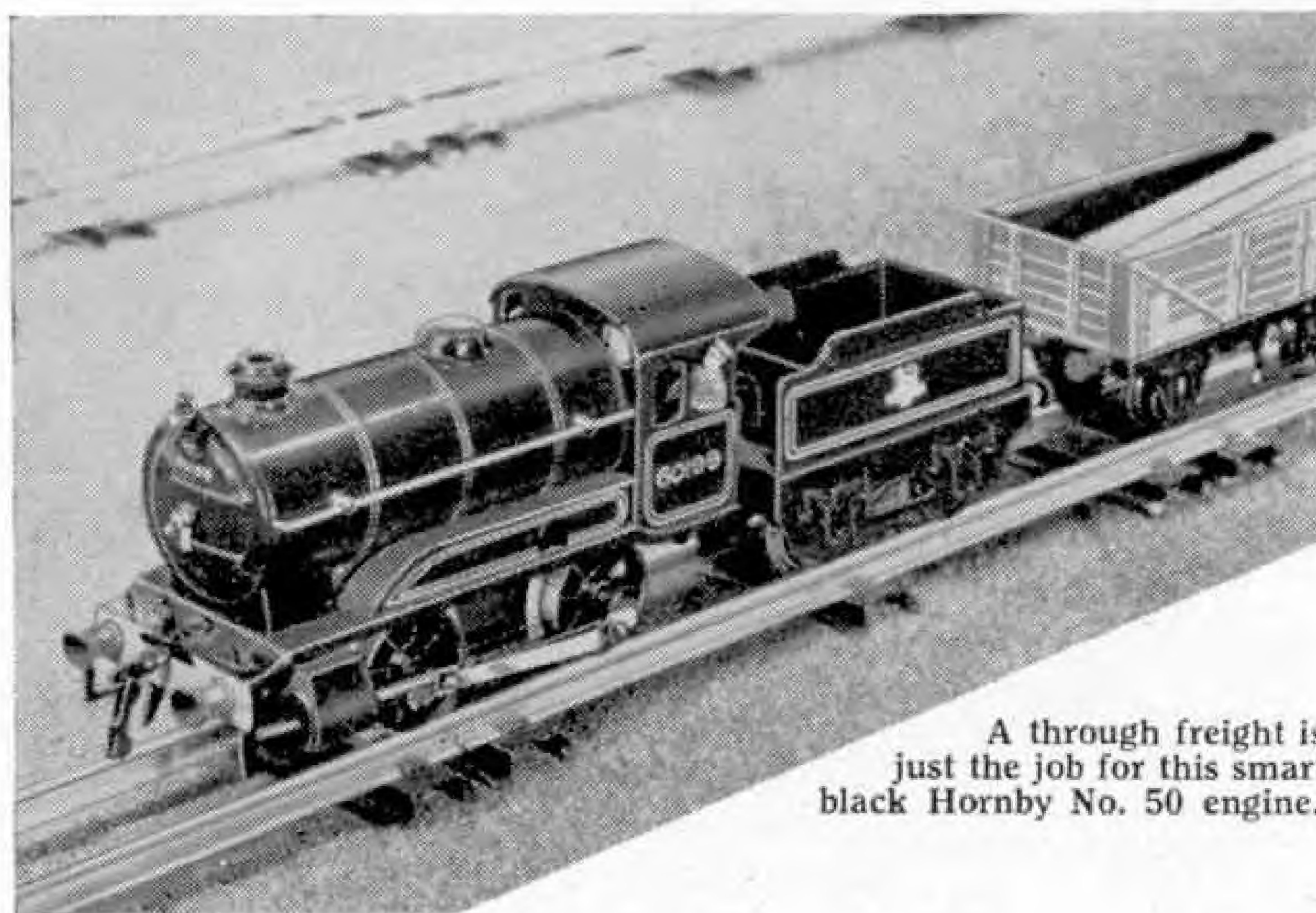
A stopping train on a Hornby railway headed by a No. 40 Tank Locomotive passes the Signal Cabin. In the foreground are several of the new corridor type No. 51 Coaches in B.R. livery.

rolling stock have made their presence felt in improved services, and there is no reason why we should not similarly improve our train services in miniature, once our new equipment has become "run-in". An interesting instance of the sort of thing we might follow is found in certain local services in South Wales. There a revised train service on the regular-interval system was begun some time ago and in order to assist in maintaining this a group of B.R. Standard tank locomotives is stationed in the district.

Now on a Hornby clockwork railway a regular-interval system of working is quite easily arranged, especially on a continuous layout. Even if there is only one station on the circuit, this can serve to represent various stopping places in the course of the journey that is made by our train. This is an operating liberty that is often taken in

or further Brake Vans. Of course passenger brake vans are in heavy demand during times of holiday traffic, as there is always plenty of luggage to be dealt with.

Nowadays the Hornby railway owner is much better off in this respect than he was before. He is provided with two separate types of Passenger Brake Vans, one representing the corridor vehicles used on main line expresses, some of which are in B.R. red and cream for running in selected passenger trains. This is the type represented by the No. 51 Passenger Brake Van, which has a very distinguished appearance in its smart livery. The other type is the No. 41 Passenger Brake Van that belongs to the Tank Passenger Train Set mentioned earlier. As a variation from running our passenger trains, whether long-distance or local, we can make up a van train consisting of one or two of these



A through freight is just the job for this smart black Hornby No. 50 engine.

Passenger Brakes, possibly in the two different liveries, with one or more Hornby No. 1 Goods Vans. Miscellaneous trains of this character run regularly for parcels and similar traffic, and there are of course many specials of this kind, particularly at holiday time.

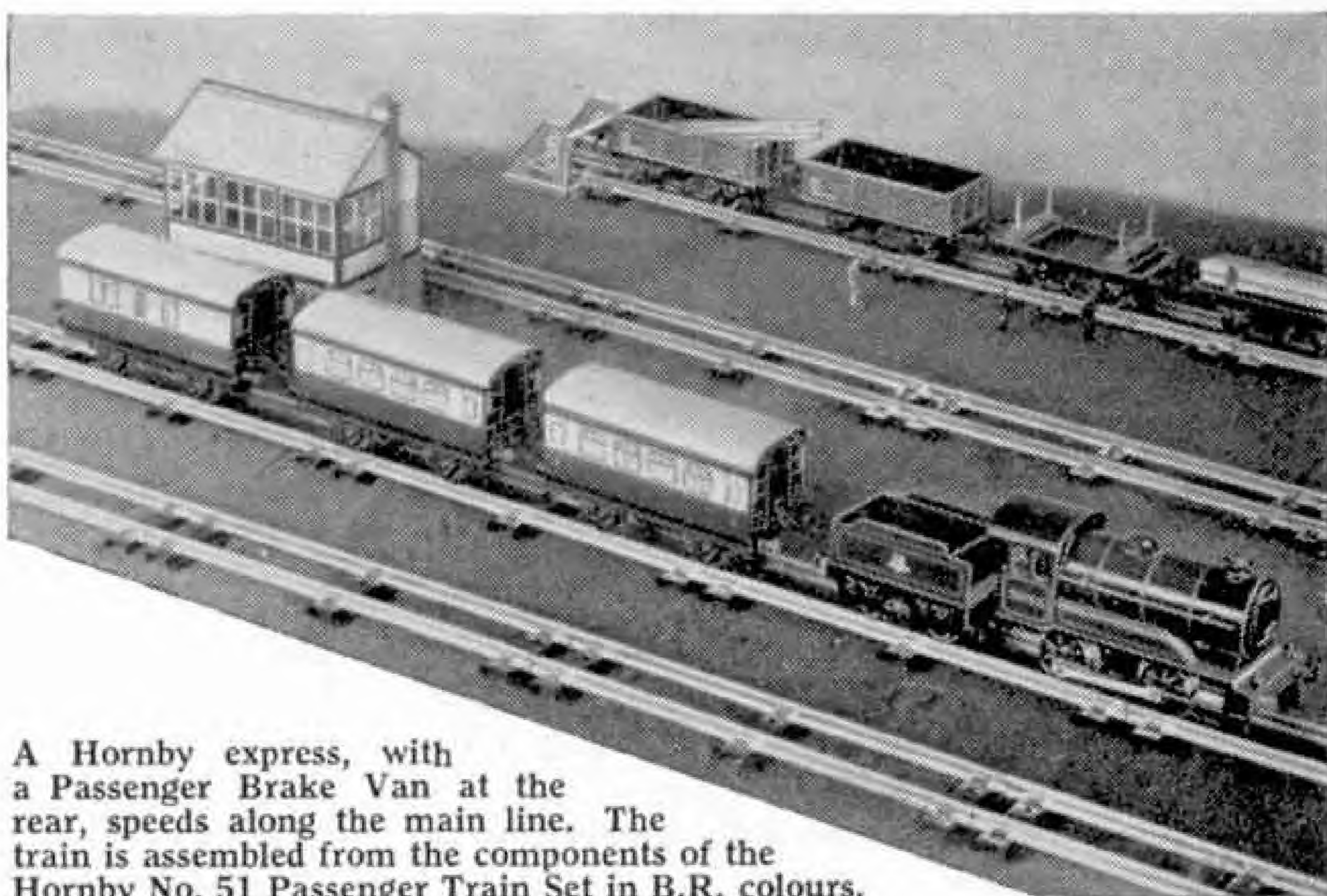
The introduction of B.R. colours has been of benefit to the Hornby railway owner in another interesting way. In place of the one No. 501

Locomotive there are now two engines of similar design, the No. 50 and the No. 51. The latter is the passenger engine, and is therefore finished in B.R. green specially for running the red and cream corridor stock that we have been talking about. The other is similar in design, but is finished in the attractive B.R. style for mixed traffic locomotives, that is black with red and grey lining, a workmanlike finish for an engine of this kind. There would be nothing wrong in allowing the 50 and the

51 Locomotives to interchange their duties to a certain extent. For van trains and similar miscellaneous jobs the black one, No. 50, will probably be first favourite, but for the more important express trains then the green engine, No. 51, undoubtedly will be more correct.

to the rear end of the No. 40 Tank and to the tenders used for Nos. 50 and 51 locomotives. Correct "lamping" adds to the fun and realism of operations, and Hornby engines are better off in this respect than many more elaborate models.

Some of you may say "*We don't know what the Headlamp indications mean*". Well, the answer to that is simple. The British Standard Headlamp code is given on page



A Hornby express, with a Passenger Brake Van at the rear, speeds along the main line. The train is assembled from the components of the Hornby No. 51 Passenger Train Set in B.R. colours.

12 of the H.R.C. booklet that is forwarded to all members on enrolment. It shows the ten different arrangements of headlamps that are used to distinguish the different classes of B.R. trains. There still appear to be certain local variations, but these need not worry you.

Whatever kind of trains we run—and there are sure to be plenty in an intensive running programme—we should endeavour to see that the engines of these carry their headlamps in the correct places according to the type of train. This is a feature in which the Hornby railway owner is well provided for; every Hornby locomotive of current production, except the No. 20 and M1 types, is fitted with headlamp brackets and is sent out with the requisite lamps. The fitting of brackets applies



Miniature Railway Progress at Swindon

A Club Layout in Hornby-Dublo

WHEN a number of railwaymen get together to form a model railway club and build up a layout, one can expect a truly realistic and worth-while effort. Such a result has certainly been achieved by the Swindon Model Railway Club, the prime movers in which are principally Western Region locomotive men. It is a remarkable tribute to the fascination of railway operation that these members are keen enough railwaymen to get together in their spare time to assemble a miniature railway system, and to carry out on it on a small scale many of the operations that constitute their daily—or nightly—work.

The photographs reproduced on this and the following page suggest that Swindon has certainly got down to the job with characteristic thoroughness. From whatever angle the layout is viewed it really looks like a railway. So many layouts are somehow lacking in this respect, particularly if they are of the concentrated type in which there is no clear distinction between individual sections such as stations, goods yards and so on.

Of course, space is an important factor and very often the owner of a small layout simply *has* to crowd things together. In this respect our Swindon friends are

fortunate, for they have been able to construct an extensive baseboard 16 ft. by 8 ft. that is encircled by a long double track main line. Notice that these professionals have not been averse to using the continuous type of track that is sometimes criticised by lay enthusiasts. The reason is of course that within the limits of a normal baseboard long through runs can only be performed on a continuous track.

Running loops and relief lines are provided, these subsidiary tracks being correctly spaced apart from the main line. Sidings for rolling stock and goods purposes do

not branch directly from the main line, but from inner tracks strategically placed. Admittedly the engine shed tracks are run directly from the main line, but this is understandable. The engines themselves are single units, readily moved where required. Through the correctly laid trailing connection with the inner main line, engines can move in or out of the shed premises much more quickly than a train of wagons can be disposed of, for instance.

As might have been expected, some of the special buildings, such as the engine shed, have been made particularly to suit their location and purpose, but the standard

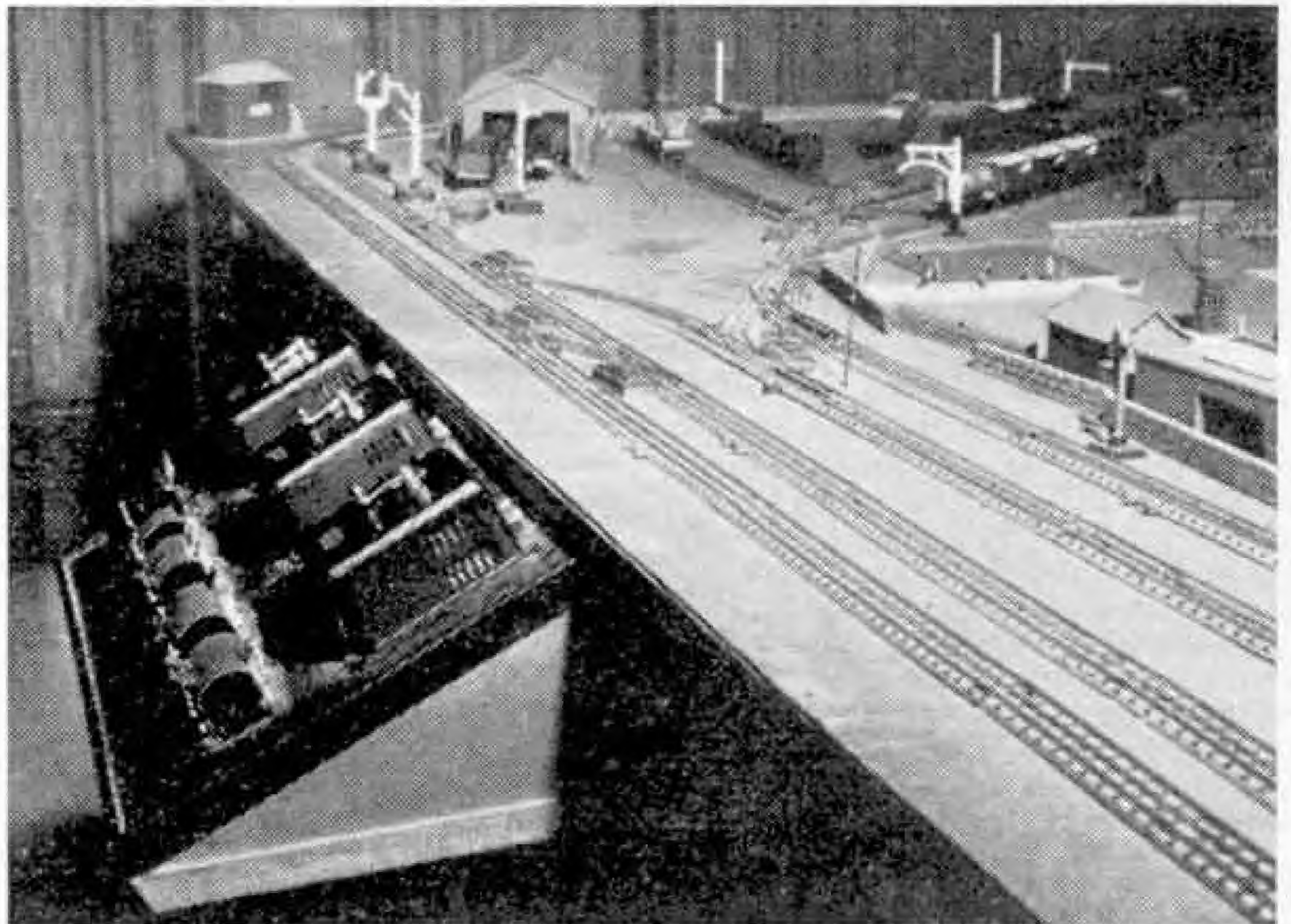
Above is a corner of the Hornby-Dublo layout of the Swindon Model Railway Club. The illustrations to this article are by T. Richards, Swindon.

The Swindon layout is well-planned and railwaylike, with the control panel neatly arranged like a desk alongside the main baseboard.

Hornby-Dublo Station, Island Platform and Footbridge also are used and can be seen in the lower illustration on this page. The track, which is laid so realistically, and the trains which are marshalled and run just as real ones are, and such items as signals, water crane, and so on, are all Hornby-Dublo products. It is surely a tribute to their soundness in design, construction and performance that they should be adopted by real railwaymen who wish to operate their miniature railway according to correct principles.

The control panel is specially noteworthy, for it has a practical and railway-like arrangement. As will be seen from one of our pictures, there is literally a control "desk", forming an adjunct to the main baseboard. This keeps the edges of the latter free from all Controllers and other electrical gear, and so allows the whole of the baseboard space to be used for layout purposes.

The neat arrangement of the control panel and of the appliances mounted on it is specially to be commended. Controllers are in line, properly spaced out from one another, and below them are blocks of Isolating Switches and Points and Signal Switches of the characteristic Hornby-Dublo type that form, in effect, several



separate lever frames. It is much more practical to have a tidy arrangement like this, for with it operating is much easier, especially on an extensive system like the one we are talking about, and here too the controls are not so concentrated as to make it impossible for more than one operator to handle traffic.

Hornby-Dublo *Duchess* locomotives are the principal main line units for express passenger and fast main line freight work. A *Duchess of Atholl* is approaching the camera in one of our views and you will notice what a realistic impression is given by this massive engine and its important looking train, consisting principally of vans—vacuum braked no doubt!

Although train running in a realistic manner is the principal purpose of this system—as it should be on all miniature railways—miniature buildings, walls, roads,

pavements and so on also have been constructed. Dinky Toys provide the road traffic. Road and rail interests are obviously co-operative, and a good local bus service connects with the trains.

A group of Swindon M.R.C. members with the Manager of the Gaumont Cinema, Swindon, where the layout was displayed last year.





Club and Branch News



WITH THE SECRETARY

START A MODEL AIRCRAFT SECTION

It was a happy idea of the Launceston M.C. to invite an experienced constructor of model aeroplanes to give a talk to the members on this very topical subject. His acceptance of the Club's further invitation to accompany them on a trip to Wilsey Down for model aircraft flying and there demonstrate some of his large models showed that he appreciated the keen interest taken in his Talk. Given good weather, the outing could not fail to be both enjoyable and instructive to the Club's model aircraft enthusiasts, and I have no doubt that they picked up many useful hints.

Launceston, of course, is not the only Meccano Club to run a Model Aeroplane section, but there are many Clubs that do not appear to have thought of this excellent hobby when planning their Summer programme. I commend it to them, for it has the merit of being a delightful outdoor recreation for the long Summer evenings, while the building of the model aeroplanes provides a most interesting indoor activity when our fickle weather causes outdoor meetings and events to be cancelled.

CLUB NOTES

LAUNCESTON M.C.—The Meccano Engines contest produced some excellent models, outstanding among which were one of the "Rocket" and two model horizontal steam engines. Mr. Maddever gave an excellent talk on *Flying Model Aircraft*, and he has promised to accompany the Club on a trip to Wilsey Down for model aircraft flying and there to fly his large model 'planes. Another interesting recent talk was by Mr. Cullington on miniature waterline models, and he illustrated it with examples of his work in various stages of construction. Club roll: 40. *Secretary*: R. J. Keast, Lytham, Dunheved Road, Launceston, Cornwall.

CRYPT GRAMMAR SCHOOL M.C.—The subject of a model-building competition was *Anything to do with a Railway*. One member, named Ling, built for it a fine model of a S. R. Merchant Navy locomotive. Members are looking forward to the Club annual outing. Club roll: 44. *Secretary*: R. J. H. Carter, "Daneway," 162 Hucclecote Road, Hucclecote, Gloucester.

AUSTRALIA

MAYLANDS M.C.—Model-building and games meetings have continued with keen enthusiasm. Members have been busy demolishing a recently-vacated old building on the Club property, and it is hoped to erect a new Club room on the cleared site. Club roll: 43. *Leader*: Mr. V. Malmgreen, 16 Kennedy Street, Maylands, Western Australia.

INDIA

MYSORE M.C.—The Club were privileged to stage an excellent display of Meccano

models at a new Scout headquarters when these premises were ceremonially opened recently by His Highness the Maharaja of Mysore. Afterwards His Highness toured the display, and expressed great pleasure at the splendid models; and at the request of the Club President signed the Visitors' book. Members enjoyed an excursion by car to K. R. Sagar dam and Brindavan gardens. It is hoped to visit the local railway workshop and a sandal wood oil factory. Club roll: 12. *Secretary*: Mr. M. N. Radhakrishna, 1096, Chamaraja Puram, Mysore City, India.

NEW ZEALAND

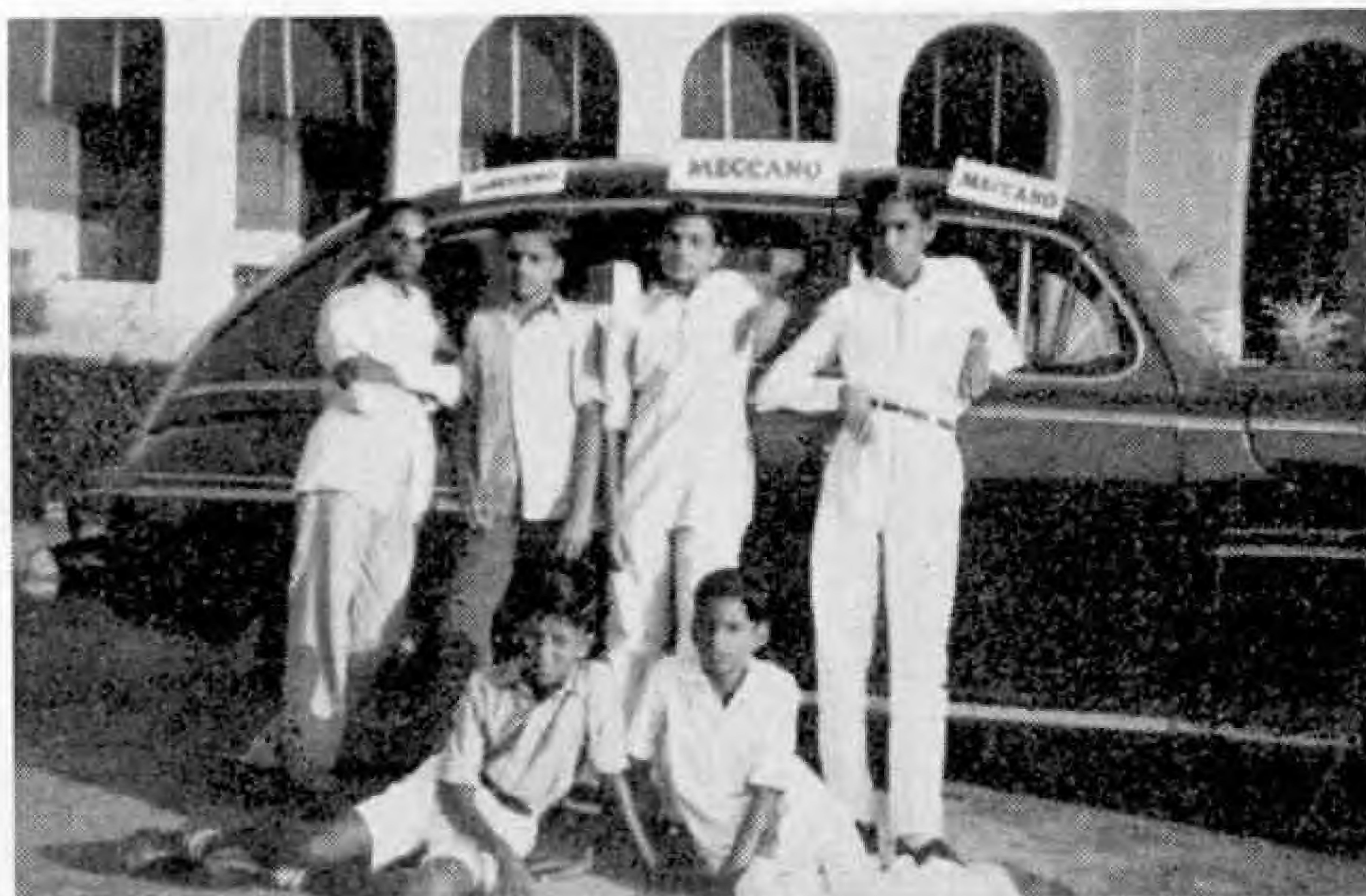
CHRISTCHURCH M.C.—Recent model-building competitions have produced very good results, a feature of which has been the large number of working models. It has been suggested that the Club arrange a display of models in one of the leading shop windows in Christchurch during the August school holidays. *Secretary*: M. D. Fraser, 115 Ruskin Street, Spreydon, Christchurch, S.I., New Zealand.

SOUTH AFRICA

CAPE PENINSULA M.C.—Some outstanding Meccano models have been completed, and activity in this line is now on such a large scale that steps are being taken to obtain a larger Club room. Lectures and film shows add variety to the programme. Club roll: 27. *Secretary*: M. Adler, 10 Lisdale, Beach Road, Sea Point, Cape, South Africa.

BRANCH NEWS

KENTISH TOWN (LONDON)—Between 75 and 100 people visited the Branch's second annual Exhibition. A fine electrically-operated layout was put down for the occasion, and the equipment used included nine locomotives, seven coaches and twenty wagons. Meccano models also displayed included a 6 ft. one of Sydney Harbour Bridge. *Secretary*: J. A. Kirby, 9 Busby Place Kentish Town, London N.W.5.



Some of the members of the Mysore (India) M.C. photographed during the enjoyable excursion by car to K. R. Sagar dam referred to on this page. The industrious Secretary, Mr. M. N. Radhakrishna, is on the extreme right. This progressive and enthusiastic Club was affiliated with the Meccano Guild in July last year, and already has become well-known locally for its outstanding Meccano model-building achievements.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

MAUD HEATH'S CAUSEWAY

The monument to the memory of Maud Heath on Wick Hill, near Chippenham, is a reminder of the fact that in olden days the repair and upkeep of our roadways was partly dependent on private generosity. Just as religious houses constructed

The causeway is reached by the road due south from Chippenham. The monument stands on a hill on the left hand side of the road; and from this high ground there is a wide view over the valley of the Avon.

A PHILLIP (Hassocks, Sussex).

THE BRIDGETOWN DOCK

The dock at Bridgetown, Barbados, accommodates schooners and small motor vessels of about 500 tons. It has thirty-one beams crossways spaced at intervals along the sides. On these there is a network of boards that run lengthwise to form the base on which boats are supported. Through each beam, at the very end, there is a large screwed rod. This passes through the centre of a two-foot spur gear, the centre of which has a screw thread in it that is gripped by the rod. The spur meshes with a non-reversible worm, through which the drive shaft passes. Power comes through the shaft to the worm, which meshes with the spur to move the platform. On the right side of each worm there is a dog-clutch.

There are altogether thirty-one beams and sixty-two rods. Power comes from an ancient steam engine, dating, with the dock, from about 1850 or 1860!

DAVID A. C. NOOTT

(Bridgetown, Barbados).



A section of the interesting causeway described in the accompanying article. Photograph by A. Phillip, Hassocks, Sussex.

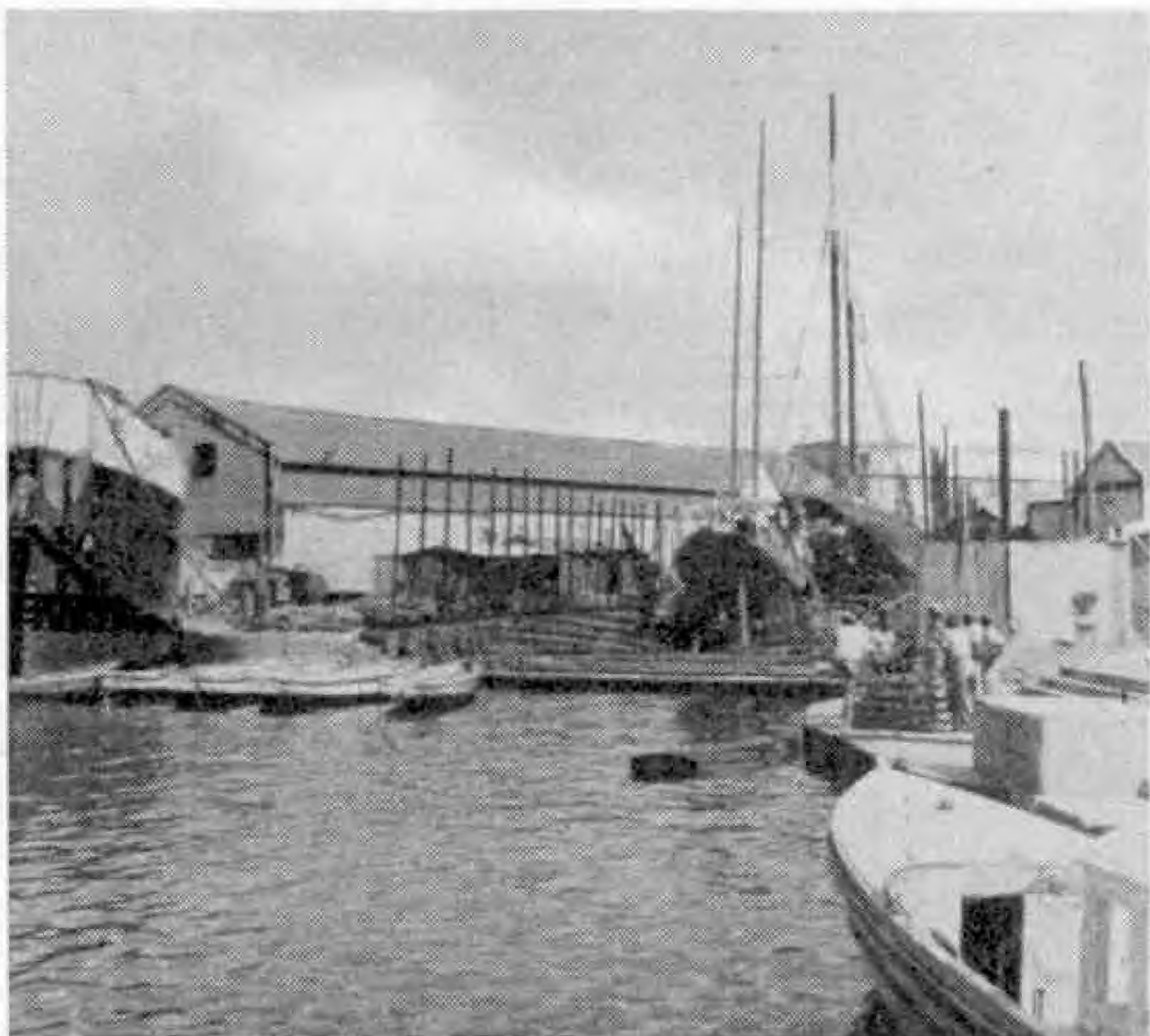
bridges across the rivers, and maintained them by the tolls paid by travellers, so local residents for their own convenience, and that of other users of the road, often made new roadways, or repaired those in existence.

Maud Heath was a worthy woman of Langley Burrell in the fifteenth century. When journeying to market at Chippenham, she found the roadway at times impassable because of the flooding of the river Avon, so at her death she left her life's savings for the construction and maintenance of a causeway through her own village of Langley Burrell to Chippenham. This raised causeway, in parts built upon stone arches, was constructed shortly after her death; and the remainder of her legacy is used for its preservation.

The causeway is nearly five miles in length, and runs by Langley Burrell, Wick, Kellaways and Tytherton to Chippenham.

The monument was erected in 1838, nearly four centuries after the death of the benefactress, through the instrumentality of the Marquess of Lansdowne. It is forty feet in height, and is crowned with a statue of Maud Heath seated with her basket in her hand. On it are inscribed words of warning and advice, such as:

"Oh, early passenger, look up, be wise,
And think how night and day time
onward flies."



The old dock at Bridgetown, Barbados. Photograph by David A. C. Noot.

BARGAIN DISCOUNT APPROVALS!

Do you want really FIRST-CLASS Approvals? Then try our Bargain Discount Approvals. Only picked stamps included, with book of sets as well. They're post free one way, too. Br. Cols. or B.C. and Foreign Mixed available. "Wants" lists of single stamps (not Countries) welcomed. Send with confidence. You won't be pestered to buy.

THE BIRKDALE STAMP CO.
104 Liverpool Rd., Southport, Lancs.



Postal Business Only
(NO CALLERS)

**F
R
E
E**



The "JUNGLE" packet contains 3 stamps from ANGOLA showing wild animals in natural surroundings, such as the elephant, leopard, etc. Write now for these magnificent multi-coloured stamps, enclosing 3d. postage and requesting our World-famous Approvals and price list.
LISBURN & TOWNSEND LTD. (MM)
WEST KIRBY, WIRRAL

STAMPS! 20 FREE

To Applicants for Approvals from Farthing upwards.
G. LAWTHORP, 124 Grand Parade, Belfast

1,000 STAMPS 7/6

ALL DIFFERENT. NO GREAT BRITAIN

500, 3/6. 250, 1/9. 100, 10d.

Br. Empire: 100, 1/6; 200, 3/6; 300, 7/3; 500, 15/6; 1000, 56/-. Triangulars: 10, 1/6; 25, 4/6; 50, 10/-; 100, 30/-; Rly. Engines: 15, 1/6; 25, 2/6; 50, 5/6. Maps: 10, 1/6; 25, 2/9. Ships: 10, 1/3; 25, 2/6. Postage 2½d. extra. All current British Colonial mint stamps in stock, including Coronation stamps and all new Elizabethan issues. Lists on request.

S. TATLOW & SONS, ECKINGTON, SHEFFIELD

FREE THREE COMPLETE SETS FREE!

Davmar's latest Free Offer is made to everyone applying for our approvals. Write to-day, enclosing 2½d. postage, and stating age to:-

THE DAYMAR STAMP CO. (Dept. MM)
88 Margaret Rd., East Barnet, Herts.

Special Offer : Genuine Reductions

(approx. 50%) in all our famous mixed selections PLUS usual generous discount. DON'T HESITATE—send 2½d. stamp NOW to:
MERTON STAMP APPROVAL SERVICE (M5)
24 DANE ROAD, MERTON, LONDON S.W.19

MODERN UNSORTED HALF POUND PACKAGES:
All contain Pictorials and new issues. British Empire, 13/-; Australia, 7/-; Gt. Britain, 3/-; Eire, 4/6; France, 5/9; Europe, 7/6; World, 9/9. ½ lb. lots; half rate plus 9d. Postage abroad: add 1/- lb. Lists 3d.
A. DAVIES (M/7), 111 Holme Lacy Road, Hereford

FREE - TWO NEW QUEEN STAMPS

From BAHAMAS will be sent Absolutely Free to collectors who send 2½d. stamp for postage and ask to see our famous approvals.
BROADWAY APPROVALS (M09), 12 CHEAPSIDE, LONDON E.C.2

LOOK! 25 LARGE PICTORIAL STAMPS FREE

Just request our pictorial approvals. Postage 2½d.

MARTIN'S STAMP CIRCLE (M.M.)

24 Catherine St., SHEFFIELD 3. Shop: 346 Abbeydale Rd.

NEW ZEALAND HEALTHS

THIS MONTH ALL GENUINE APPROVAL APPLICANTS WILL RECEIVE FREE THE 1953 NEW ZEALAND HEALTH SET SHOWING GIRL GUIDES AND BOY SCOUTS. SEND 2½d. FOR POSTAGE AND REQUEST APPROVALS.
H. B. LANG, BURNBANK, MAUCHLINE, Ayrshire

FREE! QUEEN ELIZABETH PACKET

A Fine Packet of Q.E. II STAMPS, including ROYAL VISIT STAMP, CORONATION STAMP and the TWO NEW ISSUES FROM ST. LUCIA will be given to all asking to see my 6d. in 1/- DISCOUNT APPROVALS. THESE BOOKS CONTAIN MANY Q.E. II STAMPS.

M. THEOBALD (MM41)

6 DELL CORNER, WEST DRAYTON, MIDDLESEX

COLOMBIA Fine stamp showing Cowboy on "Bucking Bronco," also Flower Pict. and Hungary and Germany Stalin Mourning. 2½d. stamp Approvals.
COOMBERS STORES, 20 MELBOURNE ROAD, CHATHAM

U.S.A. All diff. 50 × 1/-; 100 × 3/3; 200 × 11/6; Commems. 25 × 1/6; 50 × 3/-; Postage 2½d.
FRED HARLOW, 2 ROBYN'S WAY, SEVENOAKS, KENT

FREE - STAMPS CATALOGUED 5/-

to applicants for ½d. approvals.

COX, 17 STONELEIGH PARK ROAD, EWELL



LATEST CANADA WILD LIFE, AUSTRALIA Royal Visit, NEW Q.E. ISSUES (as illustrated) FREE

To collectors asking to see our famous "Quality" Approvals. Send 3d. (Abroad 6d.) for our Postage & Illus. List. If you wish you may join "THE CODE STAMP CLUB." Year's Sub. 1/-. You receive Badge, Membership Card listing fine gifts. Approvals sent Monthly. We aim to satisfy you. (Monthly selections a speciality). Please state if adult. (Postal Sect. Est. 1897).

WRIGHT'S STAMP SHOP (M57),
29 PALACE STREET, CANTERBURY, KENT

For other Stamp Advertisements see also page 356

Stamp Collectors' Corner

By F. E. Metcalfe

THE QUEEN'S STAMPS

LAST month I left the question of a Queen Elizabeth collection at the point where we had got our new album and our Commonwealth Catalogue. Regarding the latter, no doubt you were sure to get the one priced at 3/6, for the other, which costs more, contains also the stamps of the last reign, and KG VI stamps are at the moment outside our subject.

I do hope too that you got a plain loose leaf album, for by using one of these you can mount just which stamps you like, and just those you have. Perhaps your pocket only allows you to go up to a top face value of 1/-, or even lower. You can still make a good show,



but when you are arranging the set be careful to leave space for the higher values you are likely to get.

As an example of what I mean, let us take it that you

are going to mount Australia, and that of the ordinary stamps you have only got the 1d., 3d. and 3½d. values with the Queen's portrait. But you will notice that the first stamp in the catalogue is the 2/6 value, with the aborigine's head. Incidentally this head, it may interest some to know, is an actual portrait of a living native of Australia, who has become a well-known character since this discovery. Anyhow, we will take it that you have not got a copy of this stamp yet.

That is quite all right. There is nothing to stop your mounting what stamps you have got. Just leave about two inches from the top line of the page, and mount your "Queen's Heads" from below. Later no doubt you'll get your half-crown value and then all you have to do, is to mount the stamp in the space provided. Perhaps Uncle, if he sees the empty space, may provide the wherewithal, but don't make the touch too obvious, for Uncles, having been young themselves once, are not so simple as they may appear at first sight!

The question of writing up bothers many. While hand printing is to be preferred, if good, far better write if you are not a dab hand at forming separate letters, which is all printing is anyhow. But you will be absolutely surprised what little practice is necessary to do passable printing, if you will only try. Get any piece of plain paper. Draw a few horizontal guide lines in pencil—these are very important if you want to print well—and lightly practice for half an hour. And then think how proud you will be of your own collection—all done by yourself.

You don't want a lot of writing in a Queen Elizabeth collection. At the top of the page print as carefully as you can the name of the country. Don't forget those light pencil lines, as guides, and when the ink is dry, rub the lines out. Oh, and by the way, no ball pens! These are hopeless for a good printing job, on rough



paper. The best ink to use is Chinese black, but ordinary blue-black ink will do at a push, and if you use a J nib you can get some nice shading effects.

Besides the set of stamps, you must include the date when the set was issued, or just the year if that is all that is known; but in the Commonwealth Catalogue care is taken to give all dates of issue. The perforation measurement, details of the watermark and not much else also are needed. If you were doing a thematic collection, all kinds of details would have to be included. I should say, however, that if you are mounting stamps that belong to special issues, then you had better include the details.

If you copy them as given in the catalogue, that will be all that is needed.

I mentioned last month that this time I would deal with the question of a new issue service. This is a method, and a very good one, of buying current stamps as they are issued. Most stamp dealers run one, so readers will have little difficulty in finding someone who will supply Queen Elizabeth stamps on a contract basis.

This is how it is all worked. First of all you ask your proposed supplier for a copy of his contract form. All countries in the Commonwealth will be listed, and you simply cross out any that you do not want to receive. Then you will have to decide if you want to take varieties, such as shades and new perforations. Better take these, for you will often get good stamps thus, at normal rates. Finally you will have to decide to what face value you will take stamps. Don't forget that you will be contracting to take all stamps that appear, and will have to give a month's notice when you want to quit, so your pocket will have to be your guide here.

Let us suppose that you can afford to spend £1 per week, then you can fairly safely contract to take up to the top value, if you so desire. At the present time, with all the new sets coming out, to take all you may have to spend a little above a pound a week, at odd times, but generally the sum mentioned will suffice. If you can only afford say 10/-, then better limit your takings for the time being to 5/-.

Perhaps you only want to spend five or six shillings a week. All right, take to 1/- top value, and buy the others later on.

Now we come to the juniors, with their weekly shilling or so. Oh yes, they can collect QE issues, but I am afraid that they will not be able to join a new issue service, and so they will have to pay a little more over face than their big brothers. But never mind, they can pick up sets to 3d. and these sets of five or six stamps look very nice, if neatly mounted in that plain loose leaf album. But be sure and use a full page for each country, so that when you can afford the higher values, later on, there will be room for them without disturbing those already mounted.

So, to sum up, use a blank loose-leaf album, get really good stamp mounts and take the greatest care in mounting. Jolly good luck to your collection!



SWISS STAGECOACH FREE

Absolutely Free. To all who ask to see a Selection of Windsor stamps on Approval, we will send absolutely free this super **SWISS** stamp (printed in yellow, violet and grey) depicting a **Mail-coach drawn by Five Horses**. Dated 1849/1949 it was issued to commemorate 100 years of the Swiss Post.

To get yours **FREE**, just ask for **Swiss Stagecoach Free** and ask to see a selection of Windsor stamps on Approval. 2½d. stamp must be sent for return postage to you. Write now before our supply is exhausted.



WINDSOR STAMP CO. (Dept. M), UCKFIELD, SUSSEX

FREE

TO ALL COLLECTORS

4 NEW QUEEN STAMPS including GRENADA

Send 2½d. postage.

BARGAIN 50 CHINA - - 1/3 C.O.D. extra.

25 MONACO 1/6	50 SPAIN - 1/-
50 JAPAN - 1/3	50 RUSSIA - 2/3
25 EGYPT - 1/3	25 PERSIA - 1/6
100 B. Cols. 2/-	100 F. Cols. 3/-
200 B. Cols. 4/6	25 Vatican - 3/-
500 All diff. 5/6	1000 All diff. 10/-

G. P. KEEF - WILLINGDON - EASTBOURNE

4 TRIANGULARS FREE

Add these attractive stamps to your collection. Pigeons—Helicopter in Flight—Old Tyme Galleon and Modern Liner. These will be sent **FREE** together with a colourful selection of stamps on approval if you enclose a 2½d. stamp for postage to you.

GEM STAMP CO. (Dept. M)

514 FAIRFAX DRIVE - WESTCLIFF - ESSEX

FREE - GOLD COAST 1/- Q.E.

This fine bi-col. stamp will be given free to all genuine applicants for our famous **ONE PENNY APPROVAL BOOKLETS** of **BRIT. COLONIALS**. These Booklets abound with **JUBILEES, PEACE, CORONATIONS, SILVER WEDDINGS** and **U.P.U.** as well as the latest **Q.E. II** stamps. Best value in the world. **N.B.**—Enclose 2½d. stamp for Postage. **FENLEY'S APPROVALS, 81 Redbreast Rd., Bournemouth**

MYSTERY EXCHANGE PACKETS!

Exchange your "twicers" **FREE** from our guaranteed unsorted Free Exchange Packets which have circulated the World over. Different, profitable and interesting without payment. Details with 5 different **GOLD COAST** also **FREE** with **APPROVALS. ENCLOSE POSTAGE.** Dealers supplied. Overseas Agents Wanted.

ASTLEY & CO. (M)

103 CADMAN CRESCENT, WOLVERHAMPTON

MAMMOTH MYSTERY PACKET FREE, containing Triangular, Coronation, Large Rainier, Geo. VI Pictorials, etc., etc. (**FUN SORTING**). Write now, requesting discount approvals. Postage appreciated. Only genuine applicants need apply.

RINTON STAMP CO.

14 SUNNINGDALE DRIVE, BOSTON, LINCOLNSHIRE

5/- Post Free

DEALERS MIXTURE off Paper

5/- Post Free

Approximately 1,000 (Weighed) **UNSORTED** mixture. Good variety of old and new issues from numerous sources of supply. Constantly changing in contents. Abroad postage 1/- extra. **JOS. H. GAZE, 10 Pimlico Road, CLITHEROE, Lancs.**

100 DIFFERENT STAMPS FREE

To Approval Applicants enclosing 2½d. postage.

N. JOHNSON (Dept. M.M.), 19 Hillside, Slough, Bucks.

A GRAND BADGE

and Beautiful Free Set sent to all sending a 6d. P.O. to join our Stamp Club and see our Famous Approvals. **GLOBE STAMPS, 7 NORTHGATE, BECCLES**

3 BEAUTIFUL STAMPS

OF **PORTUGUESE BEETLES** **FREE** TO ALL ASKING TO SEE OUR **WORLD'S FAMOUS APPROVALS** **ENCLOSING A 2½d. STAMP.**

BEDFORD & CO. (Dept. M)

123 CONYBERE STREET, BIRMINGHAM 12

Fernandes the FIRE CHIEF!

Here is a really interesting gift - 25 different stamps from Portugal including the one illustrated and other large Commemoratives.



ABSOLUTELY FREE!

Just send 2½d. postage and ask to see our popular Sterling Discount Approvals, including Triangulars from 1d. each.

STERLING STAMP SERVICE (Dept. MMX), Lancing, Sussex

SPECIAL. TO ALL APPROVAL APPLICANTS THIS MONTH FREE. ANTIGUA O.E. MINT SET. 2½d. POSTAGE. A. CUNNINGHAM (Dept. MM), 36 DOONFOOT ROAD, AYR

100 DIFFERENT STAMPS FREE!

Foreign and Colonial including Pictorials, absolutely free to applicants for my famous discount approvals, enclosing 2½d. for postage.

H. BANKS, 62 AVONLEA ROAD, SALE, MANCHESTER

TERRIFIC FREE OFFER

25 Dazzling **RUSSIA**, Cat. 10/-. 7 Brilliant **FRENCH COLONIAL** Pictorials. 9 Immaculate **CHINA**, Cat. 3/4. Request Approvals beautifully mounted in loose-leaf approval books. Postage please. **G. Gwilym, School House, Hawthorn, Pontypridd, Glam.**

25 GREAT BRITAIN FREE Request Approvals. **AVON STAMPS (Dept. MM) LOWESTOFT**

For other Stamp Advertisements see also page 354

Stamp Gossip

IMPERFORATE STAMPS

A READER wrote recently to say that he had a Great Britain 4d. stamp of the KG VI period, without perforations, but with a bar cancellation. Was it worth a lot of money, as he had heard these errors were?

Well, a single stamp would not be accepted in the first place as a genuine imperforate stamp normally, but the snag here is that the stamp had not been genuinely used. In fact, it had not been used at all in a postal sense, and so I am afraid that this variety has little value. It will never be catalogued, for the bars

a r e
a p p l i e d
i n s i d e
t h e p o s t -
o f f i c e ,
a n d s u c h
s t a m p s
h a v e
b e e n
u s e d
f o r
t e c h n i c a l
n o t
p o s t a l
u s e .

I f m y
c o r -

respondent had only found a nice mint, or used pair on a cover, then indeed he would have had something worth a good few pounds.

ERRORS

Owing to the war, and the upset such an event causes, we got a number of King George VI stamps with inverted overprints, etc. We all thought that in the piping days of "peace" such aberrations would cease, but we were very wrong about this, for already one or two very nice mistakes have cropped up.

No doubt many readers of the *M.M.* who collect stamps will have a set of Queen Elizabeth stamps of Great Britain overprinted Bahrain. Now the lowest value, the $\frac{1}{2}$ d., was surcharged $\frac{1}{2}$ anna, and its present worth, if normal, is a penny. But if your copy has the $\frac{1}{2}$ missing, then it is worth about £60, and though it is very unlikely, your copy could be as this latter, for a whole sheet of 240 stamps was placed on sale at the beginning of the year in the Bahrain Post Office, and every one, as far as is known, did lack that $\frac{1}{2}$. Half the sheet had been sold before the mistake was discovered. The rest were sent to London to be destroyed.

As these lines are being written, about forty copies, mint and used, have turned up. A few would get their stamps from Bahrain

direct, so if you are one of these just take a look to see what you have got.

CORONATION STAMPS

Quite a lot of these were sold last year, but fortunately for those who bought them the sales were nothing near as heavy as the Coronation stamps of King George VI. This was not because the 1953

Coronation was not as popular with collectors as the previous one; what happened was that the 1937 series was badly overbought and collectors did not want to make the same mistake again.

I am frequently asked if the Queen Elizabeth set is going to be good, so to be able to answer that question I have been writing various post offices for their sales figures, and carefully noting those published in the Crown Agents Bulletin. Now it is possible to get a fairly true picture of what's what. Well, sufficient have been bought to prevent the stamps getting scarce for some time to come. But this time we are not likely to see those big parcels thrown on the market, to bring what they would. So I think it is quite safe to buy a set at present prices, with the assurance that if you are not going to make a fortune, you are not likely to lose one when you come to sell.

WHIZZ BANG!

No, you are wrong. The Egyptian stamp illustrated does not refer to a firework display, but is merely a single commemorative stamp issued by Egypt recently to mark the occasion of the holding in Cairo of the Electronics Exhibition. Egypt's capital has always been a very popular venue for the holding of congresses, probably because a good attendance was assured, under any pretext, for there was a lot of fun to be had. It is probably very different nowadays, but they still hold the exhibitions. Anyhow, those well up in such things will be able to tell us just what all those whizz bangs depicted on the stamp are.

HAYTI

This Caribbean country issues a lot of stamps, but because they are generally attractive, they are very popular, particularly in the U.S.A. But I am afraid that they are rather overdoing it, for on 1st January

they actually issued six sets of stamps, for one thing and another. So here is a word of warning to collectors. Better leave Haytian stamps alone, if this is going to continue, for collectors react strongly against too many new stamps, as countries like Belgium know. There was a time when modern Belgian stamps were much sought after, but in spite of their attractiveness the goose laying the eggs had its head chopped off, and it is only now that these stamps are gaining a little of their lost popularity. The same is sure to happen with Hayti. In the meanwhile it can be explained that the stamp illustrated is one of a set issued, it is said, to commemorate the 150th anniversary of Independence.

HONDURAS

We don't need to go very far from Hayti to come to the country that has issued another interesting set. Homage to the United Nations is the excuse this time for getting Waterlows to print a couple of sets, which should bring a few more lempiras into needy post office coffers. Still, we should not be too censorious. After all, we do get clever designs for our money.



From Iron Ore to Steel Tubes—(Cont. from page 313)

and which can produce 13,000 tons per week, there are two 25-ton electric furnaces operating on works scrap and producing 1,100 tons of high grade steel per week, and two Wellman Smith Owen 100-ton open hearth furnaces. The latter operate continuously, and each is capable of producing 2,000 tons of steel a week.

The next stage in the transformation of the iron ore into welded steel tubes is the rolling of the ingots of steel from the steelmaking plants, a spectacular process in which the block of white hot metal is changed into a long thin strip of metal ready for use in the final process. The rolling takes place in stages, in each of which the thickness of the metal is reduced, and under the pressure of the rollers of successive mills a heavy ingot 26 in. wide and 26 in. thick can be rolled down in one heat to billets and slabs with a minimum section of 2 in. by 2 in. or any intermediate size.

It is these billets and slabs from the train of rolling mills that are used for the final rolling into metal strip. The slabs are re-heated and then passed through one of the two strip mills in the plant. One of these consists of 12 horizontal stands and eight edging stands, and in its passage through the rolls of these stands in succession the slabs are reduced to strip up to 16½ in. wide. The No. 2 mill has 10 horizontal stands and 4 edging stands rolling strips up to 8 in. in width. In both mills the strip is rolled with a bevelled edge, the angle of the bevel varying with the size of the tube required. Our cover this month shows the hot strip passing through one of these rolling mills. As it emerges from each mill the strip is coiled hot by vertical spindle coilers, and is then transferred to slow moving conveyors on which it is cooled.

Inspection follows, after which the coils are taken by diesel shunters to the tube works, where the strips are continuously coiled round into tubes of various sizes up to 4½ in. in outside diameter, and the edges are finally welded, as explained in the article in the June M.M. already referred to.

Centenary of the N.E.R.—(Continued from page 316)

in evidence with more interchange in rostering and through running. Now there are regular non-stop runs between London and Darlington, Darlington and Peterborough, and Grantham and Newcastle by the *Flying Scotsman*, the *Tees-Tyne Pullman* and other principal expresses. In summer the world-record London-Edinburgh non-stop *Elizabethan* flyer passes through the whole of the former North Eastern main line area without halting.

Some of the company characteristics are still to be seen, such as the rather short semaphore signals or signal arms, and a distinctive style of architecture with plenty of red brick in the station buildings. On their pedestals at Darlington, Bank Top, an important main line station, can still be viewed the primitive Stephenson, four-wheeled engine *Locomotion*, of Stockton and Darlington fame, and Timothy Hackworth's *Derwent*, one of the 0-6-0s built for the same line 20 years later. In striking contrast, on my return journey to London from the N.E.R. tour in 1922 I enjoyed my first impressive run behind the pioneer G.N.R. Gresley Pacific *Great Northern*, which came on at Doncaster. It was completed in March of that year, the first of an outstanding series. Building at Darlington then were the first two Raven N.E.R. 4-6-2s to be numbered 2400-1 and destined, as it turned out, for rather a short existence.

Fire Fighting at Sea—(Continued from page 339)

fitted with elaborate devices for these purposes. Any outbreak in any part of the ship is notified to the bridge by fire detectors placed in every cabin and enclosed space. These are claimed to be so sensitive that they will register if a single match is struck in one of the smaller compartments below deck!

A method of notifying automatically the presence of smoke in the holds of large ships was introduced a few years ago. A tube fitted with a revolving fan runs

from each hold to the bridge, so that any smoke in the hold is carried up the tube and can be seen by the officers on the bridge.

The *Queen Mary* has a central fire-station and several sub-stations, and automatic fire-extinguishing apparatus is installed in 23 holds and storerooms, while foam extinguishers are always ready for action in each of her nine boiler rooms. Even the life-boats are provided with small foam extinguishers.

The furnishings of the ship are made of fire-proof material, too, and while she was being built one of the cabins was sprayed with petrol and set alight. The fireproofing had been so efficiently carried out that when the walls were examined afterwards they were found to be only slightly scorched.

New Meccano Models—(Continued from page 345)

The Trunnions make the front and the back of the driver's cockpit. Now join two 5½" Strips 3 to the Strips 2 by Angle Brackets held by bolts 4 on each side. Use these bolts also to fix in position Fishplates to carry the front axle. The axle is a 3½" Rod, and the wheels are 1" Pulleys fitted with Motor Tyres. Use Spring Clips to hold the Rod in position. For the rear axle a 2" Rod is used and its wheel is a Bush Wheel. Pass the Rod through Angle Brackets bolted to the Strips 2 and hold it in place with Spring Clips. Place the Bush Wheel between the Strips 2.

To finish the rear end of the car bend a 2½" x ½" Double Angle Strip slightly as shown and bolt it to the Trunnion 1. The top of the bonnet is also a 2½" x ½" Double Angle Strip, at the front end of which is a Flat Trunnion. Fix this Double Angle Strip to the second Trunnion bolted to the Strips 2.

Bolt a 2½" Stepped Curved Strip 5 to each of the Strips 3, and attach a 2½" Strip to each Curved Strip.

The full list of parts required to build the Three Wheel Sports Car is as follows: 4 of No. 2; 2 of No. 5; 2 of No. 10; 4 of No. 12; 1 of No. 16; 1 of No. 17; 2 of No. 22; 1 of No. 24; 4 of No. 35; 17 of No. 37a; 17 of No. 37b; 2 of No. 38; 2 of No. 48a; 2 of No. 90a; 2 of No. 126; 1 of No. 126a; 2 of No. 142c.

SOUTH LANCASHIRE LOCOMOTIVE CLUB

Readers in South Lancashire who are interested in locomotives will be glad to hear about the South Lancashire Locomotive Club. Monthly meetings are held and visits to locomotive sheds, and works, and centres of railway interest are part of the club programme. The membership fee is 1/- and there is no age limit, but it must be remembered that "under twelves" are not permitted to visit British Railways sheds and works.

Readers wanting further details should get in touch with the Secretary, Mr. C. F. Walklet, 7 Westcroft Road, Burnage, Manchester 19.

This Month's Special Articles

	Page
From Iron Ore to Steel Tubes	312
Centenary of the N.E.R.	314
by R. A. H. Weight	
Spring Balance that Weighs up to 200 Tons	317
The Story Behind the Badge	318
by John W. R. Taylor	
How Things are Made: The Modern Storage Battery	322
The Truth about the Donkey	328
by R. H. Ferry	
New B.R. Lightweight Diesel Trains ..	331
Waterways under the Hills	336
by C. P. and C. R. Weaver	
Fire Fighting at Sea	339
by Arthur Turner	

Competitions! Open To All Readers

Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

Complete This Story

Here is a picture of a fast goods train, one of the kind that you can see yourself on British Railways, on which they run both by night and by day. As a rule, those who watch trains get much more excited about crack passenger services than about goods trains. Perhaps they are right, yet our goods trains carry nearly a million tons of goods every working day, and the engines that haul them work really hard, as a glance at the smoke plume of the engine in our picture shows.

Anyway, *we* like goods trains, and so this month we are making goods train working the subject of our competition. Below is a story in which there are blank spaces where words have been omitted. Read the story, and see if you can find out what these missing words are.

"The running of goods trains is an important part of railway work and in order to be able to make them up British Railways have more than a million — . Each weekday over 16,000 freight trains operate over B.R. tracks and they carry — materials and finished products for all the principal — of the country.

"Coal traffic makes up well over half of the tonnage — , and long trains of 60 wagons or more are to be seen on some of the principal coal-carrying routes.

— engines are necessary and the overall speed of such trains, which run loose-coupled, is not high. But experiments are in progress with trains of vehicles fitted with automatic — so that ultimately faster transit may be possible.

"While many freight trains are made up of loose-coupled stock the more important services are provided either by — consisting of — vehicles or including at least a proportion of them. While we take most notice of the — of a passing freighter and possibly greet the crew with a wave of the hand, we should not forget their mate the goods guard at his end of the train. His job too is an important one, for he has to watch the running of the train up hill and down hill and assists in controlling it with his hand brake. Wayside — may give him some — problems that have to be sorted out before the train gets under way again."

If you have read so far we will give you a start. For the first blank we clearly want something that forms part of a goods train. What is it? Engine? Wagon? Guard's Van? There are more than a million of them, and this rules out the first and the last. So put wagons down on your entry. When you have found all the missing words, write them down in order

on a postcard and send it to *July Freight Train Contest, Meccano Magazine, Binns Road, Liverpool 13*, to get there by 31st August if you live in Great Britain or Northern Ireland, or by 30th November if you live overseas.

In each of the two sections of this competition, for



A London Midland fast freight train near Thrimby on the Northern ascent to Shap summit. The engine is one of the familiar Stanier class 5 mixed traffic 4-6-0s No. 44763. Photograph by Archdeacon E. Treacy.

Home and Overseas readers respectively, there will be prizes of 21/-, 15/- and 10/6, and a number of Consolation Prizes will be awarded for other deserving efforts.

Summer Holiday Photographic Contest

Thousands of you will be enjoying a holiday sometime this month or next. Most of you will be revelling in a week or more at the seaside or in the country, or perhaps will be discovering that even a holiday at home can be very enjoyable, and some of you may be travelling abroad, perhaps for the first time. But wherever you may go there will be plenty of scope for obtaining good snapshots that will serve as reminders of the occasion, and in this competition we invite you to send in the best of your 1954 holiday photographs. Don't be held back by the thought that your camera is not an expensive one. It really is *holiday pictures* that we want!

The usual restriction in these contests that only one photograph must be submitted is waived on this occasion, but no competitor will be awarded more

than one prize. Photographs submitted must have been taken by the competitor, and on the back of each print he must state exactly what the picture represents, and he must give his age along with his name and address.

The competition will be in the usual two sections, A for readers aged 16 and over, and B for those under 16. There will be separate Overseas Sections, and in each section prizes of 21/-, 15/- and 10/6 will be awarded. Entries should be addressed: *Summer Holiday Photo Contest, Meccano Magazine, Binns Road, Liverpool 13*. Closing dates: Home Section, 31st August; Overseas Section, 30th November 1954.

Competitors who desire their entries to be returned should read carefully the paragraph at the top of this page.

Fireside Fun

The colonel had an old pair of torn and dirty trousers. His batman, thinking they would be passed to him as throwouts, was surprised when he was instructed to get them patched and cleaned. Repairs were effected but he purposely made a bad job of the cleaning.

Colonel: "H'm!—not made much of a job of the cleaning Atkins—did you try ammonia?"

Atkins: "Yes sir—they fit perfect."

Boxer's Manager, just prior to weigh in: "You're still a trifle over weight, Walters."

Walters: "Gee guvnor—besides training I've starved for two weeks, had turkish baths and even cut my toe and finger nails this morning."

Manager: "Clean your teeth, then get a quick shave, and we'll try again."

Magistrate (to man charged with assault and battery): "Name?"

Prisoner: "Sparks."

Magistrate: "Trade?"

Prisoner: "Electrician."

Magistrate: "Officer—put this man in a dry cell."

The boy was being interviewed by the headmaster of his new school.

"What is your name?" asked the head.

"Pa'erson," replied the boy.

"What name, boy?" repeated the head, severely.

"Pa'erson," was again the reply. Then he added, "Spelt with two t's."

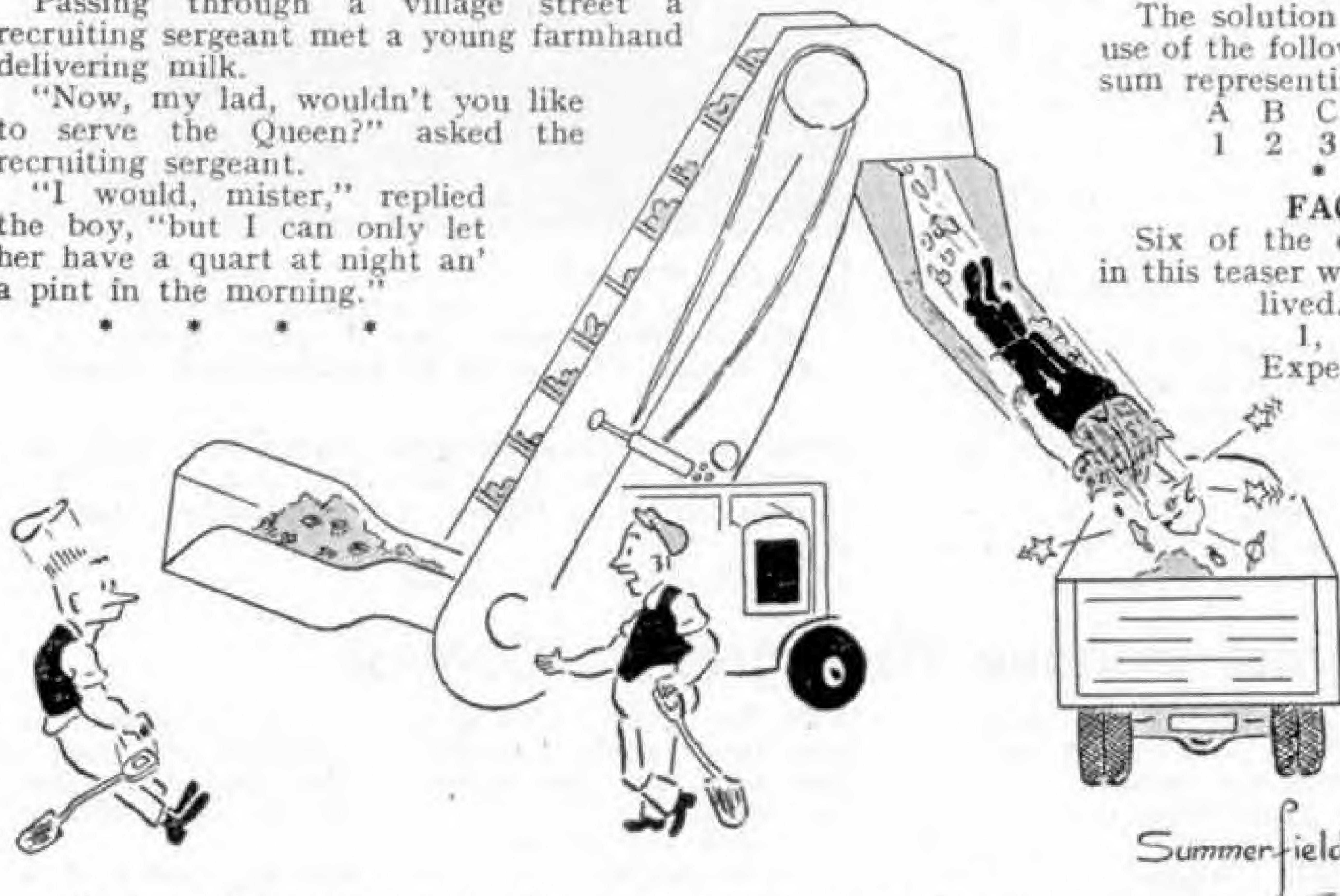
Teacher: "George, who defeated the Philistines?"

George: "I don't know, I only follow the first league teams."

Passing through a village street a recruiting sergeant met a young farmhand delivering milk.

"Now, my lad, wouldn't you like to serve the Queen?" asked the recruiting sergeant.

"I would, mister," replied the boy, "but I can only let her have a quart at night an' a pint in the morning."



"Where's Bill? He was standing right there a minute ago."

During a history lesson the teacher pointed out to the class that a surname often indicated the trade of the ancestors of those who bore the name. He gave the simple examples of Smith, Taylor, Baker and others. Then he questioned one of the boys: "What were your ancestors, Webb?"

"Must have been spiders, sir!"

BRAIN TEASERS

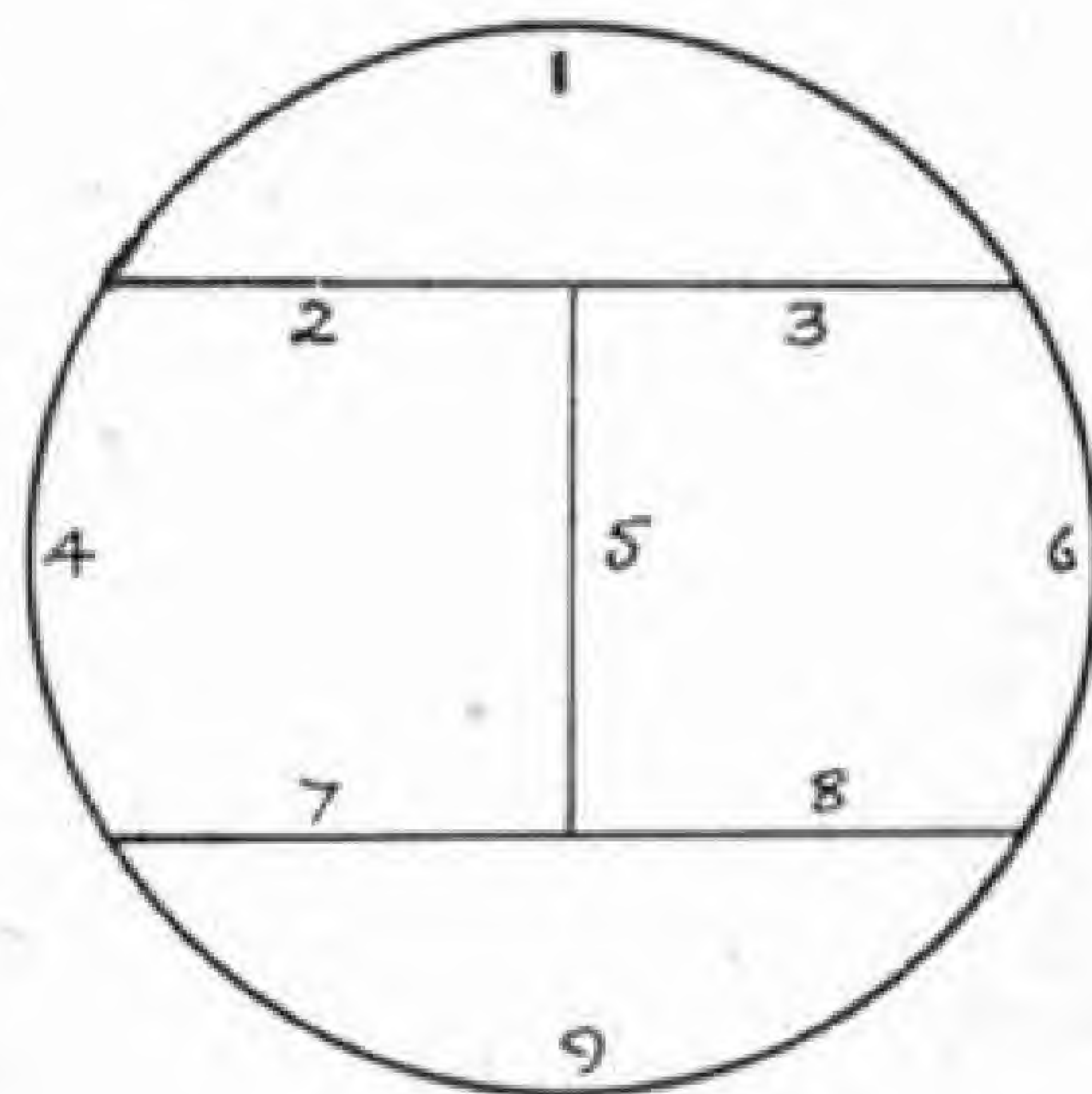
FIND THE FOUR ANIMALS

Each of the following four groups of figures represents the name of a well-known animal. Can you find the names? The same letter code is used for each of the four groups of figures.

3 — 2 — 20
1 — 4 — 2 — 12
5 — 11 — 12 — 23 — 4
3 — 11 — 22

DRAW A LINE

Can you draw one continuous line to cross, once only, each of the nine lines shown in the sketch alongside?



CAN YOU SOLVE THESE?

1. If you were alone in a small room with four walls, little ventilation and only one door, and although alone you were talking to someone else, where would you be?

2. You are looking at a long greyish building surrounded by beautiful iron railings with elaborate wrought iron gates. Behind you is a beautiful Park and you are standing on a flight of steps leading to a splendid monument. Where are you?

3. At the head of the street in front of you and standing in a great square, is a giant column bearing at its summit a figure of a man. Immediately behind you is a Monument and on your left is one of the most famous streets in Great Britain. Where exactly are you standing?

SOLUTIONS TO LAST MONTH'S PUZZLES

A LETTER SUM

The solution to this problem lies in the use of the following code, each letter in the sum representing the figure indicated:

A	B	C	D	E	F	G	H	I	J
1	2	3	4	5	6	7	8	9	0

FACT OR FICTION?

Six of the eight characters mentioned in this teaser were real people who actually lived. These six are as follows:

1, Mrs. Beeton (Cookery Expert). 2, Sweeney Todd (Fleet St. Barber). 3, Tom Thumb (American Dwarf). 5, Beau Brummell (Dandy). 6, Dick Whittington (became Lord Mayor of London). 8, Dick Turpin (English Highwayman).

THE MYSTERY MESSAGE

The key to the secret message lies in the signature "1212." This told the confederate to take one numeral and then two numerals and

so on alternately, and then to convert the numbers into letters according to their position in the alphabet, as follows:

1 — 13 — 1 — 20 — 7 — 18 — 1 — 22 —
A — M — A — T — G — R — A — V —
5 — 19 — 5 — 14 — 4 — 19 — 1 — 20
E — S — E — N — D — S — A — T
AM AT GRAVESEND SAT.

Our NEW Catalogue

With BLUE cover.

Of OO Gauge Model Railway Equipment

Gives full details of all our latest products

If you have a 00 gauge railway—or are planning one—our new catalogue is essential. We supply a wide range of products for track and rolling stock, products you will need to extend and improve your layout.

Send 1/6 Now for Your Copy

THE PRITCHARD PATENT PRODUCT CO. LTD.
PECOWAY, STATION ROAD, SEATON, DEVON

SKYRO-COPTER

The High Flying, Far Flying
NEW Model Aircraft

PULL THE
CORD AND
UP

2/9

SHE GOES

TWO FOR 5/-

Fully Tested
and
Delivered
to You

STEPHENS OF STOCKBRIDGE

54 RAEBURN PLACE, EDINBURGH 4

Every Boy will be Flying this Summer Sensation

Micromodels

Buildings, Locos, Aero,
Ships, Engines, etc.

SEND
Stamped,
addressed
envelope for
illustrated
catalogue

Micromodels
Ltd. 3(MM)
Racquet Court,
London E.C.4



BUILD YOUR
OWN MICRO-
MUSEUM

ARC. XXII.
3/4

ST.
PETER'S,
ROME

Here's FUN for EVERYONE with SPEAR'S GAMES



CAPPIT

A game for 2 – 4 players, who try to "Catch and Cap" their opponents. As easy as ludo, but much more exciting. **7/9**

TELL ME

The queen of quiz games. Spin the wheel and roll out the questions! Endless fun for any age. Any number of players, the very thing for your party. **6/3**

Obtainable from good toyshops and departmental stores. If your dealer cannot supply, write for address of nearest stockist to:

J. W. SPEAR & SONS LTD.
DEPT. M • ENFIELD • MIDDLESEX

RAILWAY BOOKS • BUS BOOKS • SHIP BOOKS • AIRCRAFT BOOKS

M.O. DEPT.
LOCOMOTIVE
PUBLICATIONS

Jen Allan Ltd

32 RAILWAY APPR.
LONDON BDG. STN.
LONDON S.E.1*For details and pictures of what's new
on the railways read***TRAINS ILLUSTRATED**^{1/6}
MONTHLY*THE LEADING ENTHUSIASTS'
MAGAZINE*SUMMER EXTRA: the July and August
issues will be enlarged to 48 pp. each.*Summer editions of***The ABC of B.R. LOCOMOTIVES**Listing the names and numbers of every B.R.
locomotive in service. Fully illustrated, in four
parts, at 2/- each.1—WESTERN 3—LONDON MIDLAND
2—SOUTHERN 4—EASTERN*and, of course, the***ABC LOCOSHED BOOK .. 2/6**

Giving allocations of all engines

*Fully illustrated with pictures, registration numbers
and silhouettes of all types seen over Britain.*

JOHN W. R. TAYLOR'S

AIRCRAFT ABC'sHELICOPTERS.....2/6
CIVIL AIRCRAFT MARKINGS.....2/6
CIVIL AIRCRAFT RECOGNITION.....2/6
MILITARY AIRCRAFT RECOGNITION..2/6
CONTINENTAL MILITARY AIRCRAFT..2/6

— All new 1954 editions —

H. M. LeFLEMING'S

ABC BRITISH WARSHIPS2/-
ABC OCEAN LINERS.....2/-
ABC OCEAN FREIGHTERS.....2/-*Will give you full details of ships to be seen around
our coasts this summer in handy pocket-size form.***THE PRIDE OF THE FLEET !****'GLENBUR' MODEL SUBMARINES****MARK I SUBMARINE** (Length 14 in.)
90 FEET OF DIVING PERFORMANCE**PRICE 21/6^D** (POST/PKG. 9d. EXTRA)

AND HER EQUALLY FAMOUS SISTER-SHIP

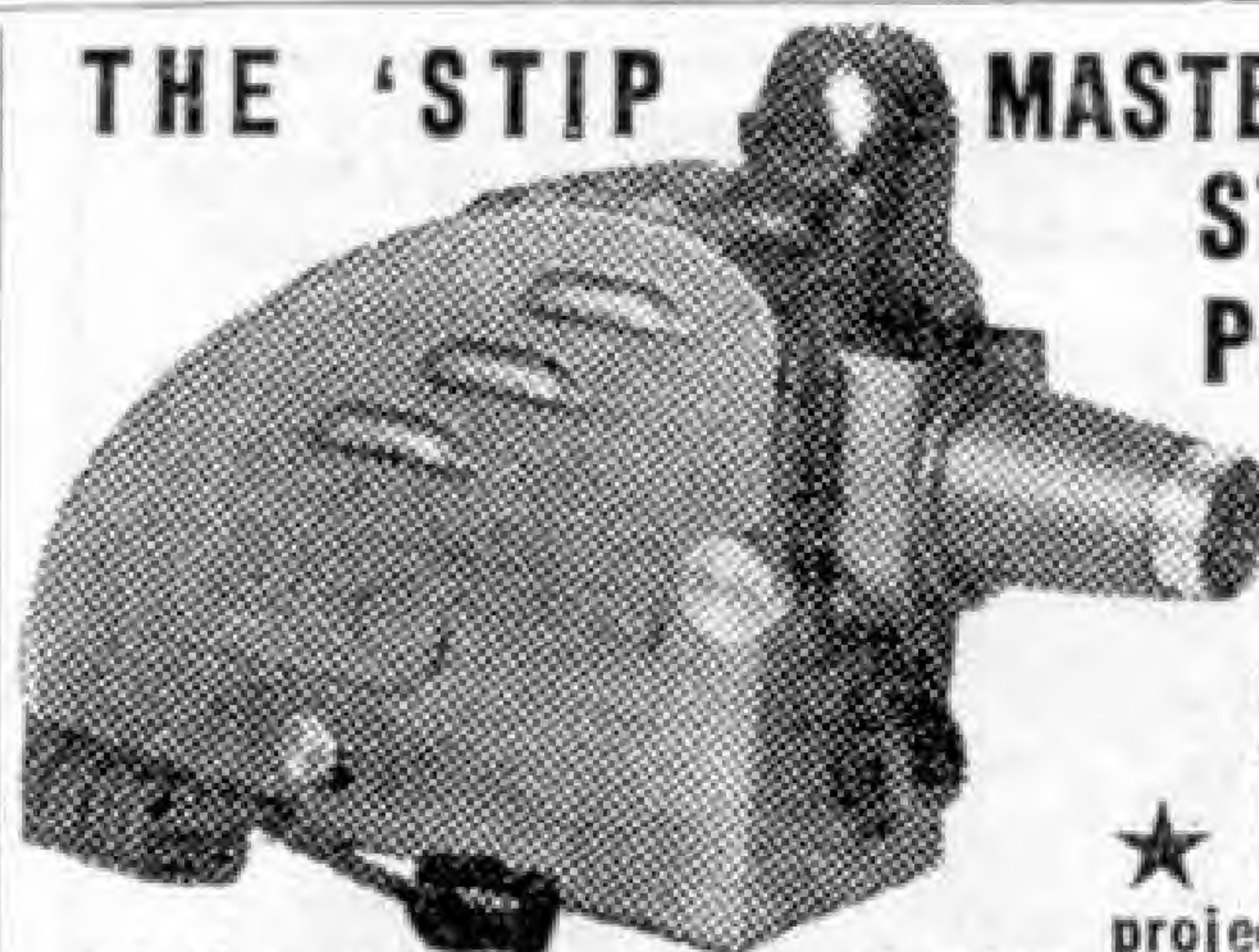
MARK II SUBMARINE (Length 7½ in.)
DIVING MORE THAN 30 FEET**PRICE 13/10^D** (POST/PKG. 6d. EXTRA)

SEND P.O. TO:—

GLEN-BURROUGHS & CO. LTD., FORMBY, LANCS., ENGLAND**CHEMISTRY APPARATUS**Send 2½d. Stamp
for latest
PRICE LIST**BOOKLETS:**

"Experiments" 10½d.

"Formulas" 10½d.

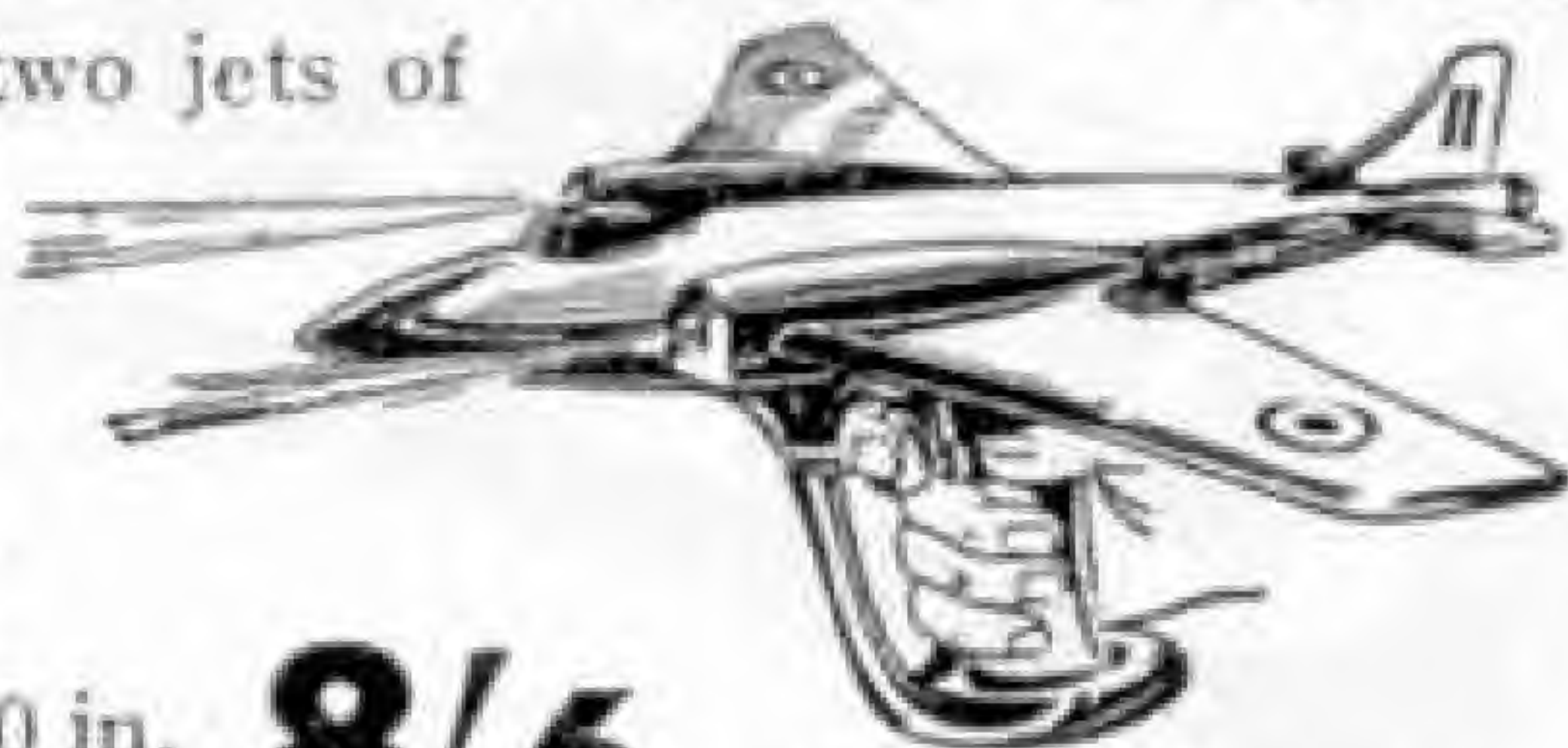
"Home
Chemistry" 2/3
Post Paid**BECK** (Scientific Dept. G), 60, High Street
STOKE NEWINGTON, LONDON N.16**THE 'STIP MASTER' 35 mm.
STRIP FILM
PROJECTOR****55/-**post & pkg. 2/-
extra or C.O.D.★ **High Quality
Focusing Lens,**
projects picture up to8 feet x 6 feet. ● Plugs direct into mains. ● Finished
Gold and Silver. ● Complete with Film. ● Magnificent
film and colour film of Entire Coronation, 7/6 extra. Huge
List of films from 1/- to 3/6 enclosed with projector.
FOWDEN FILM & OPTICAL SERVICE, 2 Hastings St., Luton

GAMAGES

offer a Grand Novelty for Boys
of all ages

JET PLANE WATER PISTOL

Designed to fire two jets of water with one squeeze on the trigger. Holds enough water with one filling to fire hundreds of shots. Length 10 in. Wing-span, 8½ in.



8/6

Post & Pkg. 6d.

**68-PAGE
CONJURING
CATALOGUE**

Post 3d. 1/-

**68-PAGE
TRAIN
CATALOGUE**

Post 3d. 1/-



The Popular REVOJET KITE PLANE

Constructed from a feather-weight plastic. Strong and virtually crashproof. A popular outdoor novelty. It

soars on its line like a bird with loudly whirring wings rotating at high speed. Complete with 100 ft. line, rod and reel.

5/11

Post & Pkg. 10d.

GAMAGES, HOLBORN, LONDON E.C.1. HOL 8484

LOTT'S Chemistry

Convert your chemistry set to a student's laboratory by easy stages.

Supplies of spare apparatus and chemicals are now available.

Also Lott's Stone Puzzle together with free book of 105 problems.

Ask to see them at your dealer or write to the manufacturers for current price list, enclosing stamped, addressed envelope 1½d.

A SMALL SELECTION
FROM OUR LIST

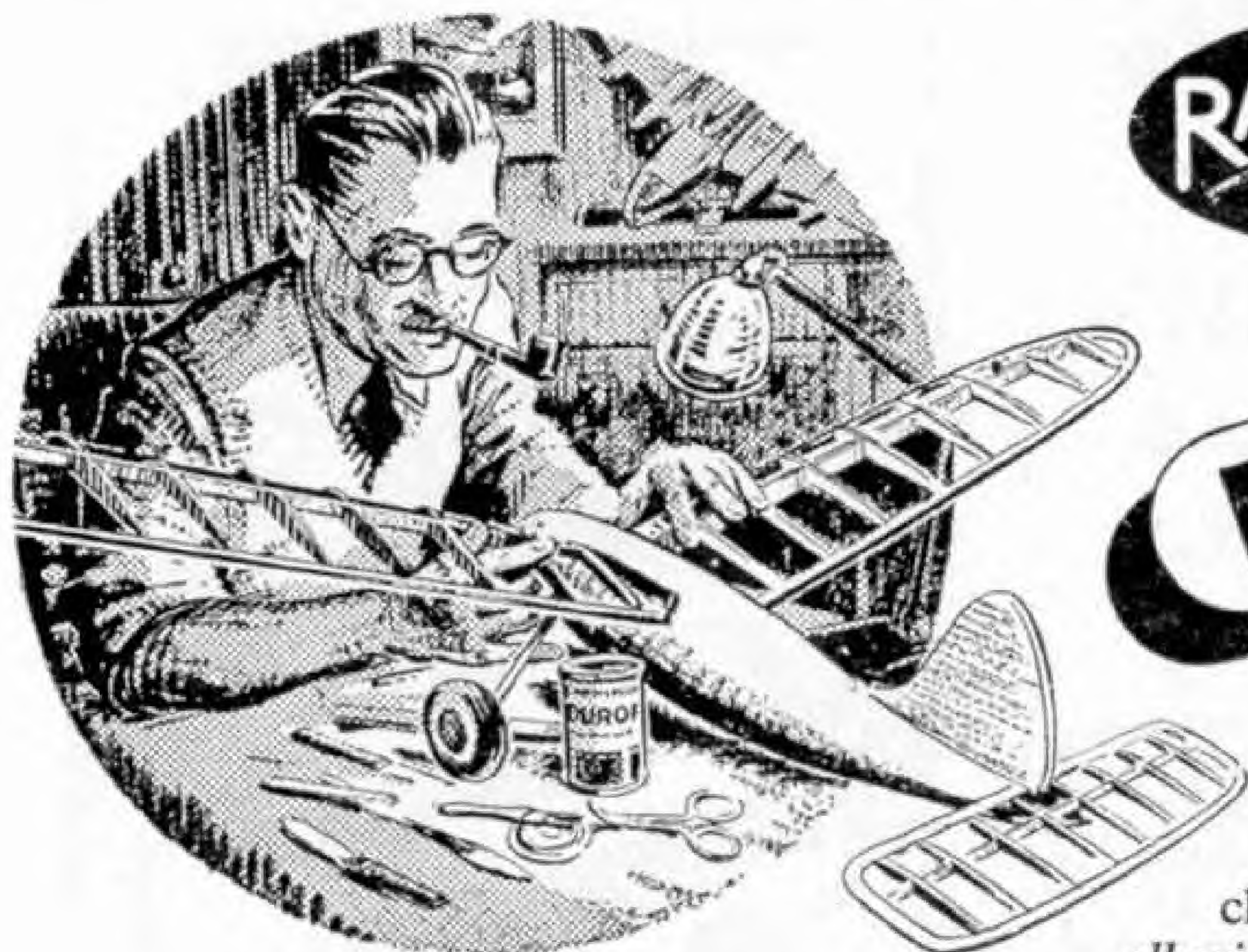


LOTT'S BRICKS LTD
(Dept. M.M. 4) WATFORD · HERTS



It's more than an
impression—it's a fact
that more cyclists
than ever ride on

DUNLOP



DUROFIX

**—THE HEATPROOF AND WATERPROOF
ADHESIVE OF ENORMOUS STRENGTH**

Balsa wood, leather or rubber, china or glass—Durofix sticks them all with a strong permanent join that is

heatproof and waterproof. Durofix is a good insulator, and once dry never becomes tacky in the hands. Durofix is colourless—joins are practically invisible. No other adhesive combines such strength and so many valuable qualities. Durofix is the perfect adhesive for model-making and home repairs.

**TRADE
ENQUIRIES
INVITED**

*Look for the name Rawlplug—
your guarantee of finest quality.*

**Tubes 9d., 1/3 & 5/-
Tins 2/9 & 10/6**

B473

THE RAWLPLUG COMPANY LIMITED, LONDON S.W.7

A CAREER AT SEA

His training over at
**THE
PRINCE OF WALES
SEA TRAINING
SCHOOL**

he begins life in the
Deck Dept. of the
Merchant Navy.

If your ambition is
to be a sailor, an intensive training course of
four months duration at one of the finest
establishments of its kind in the United King-
dom will equip you with the knowledge
and opportunity to fulfil that ambition.

Free training for sons of seamen

*Enquiries from applicants between the ages of
15 years 8 months and 16 should be addressed:*

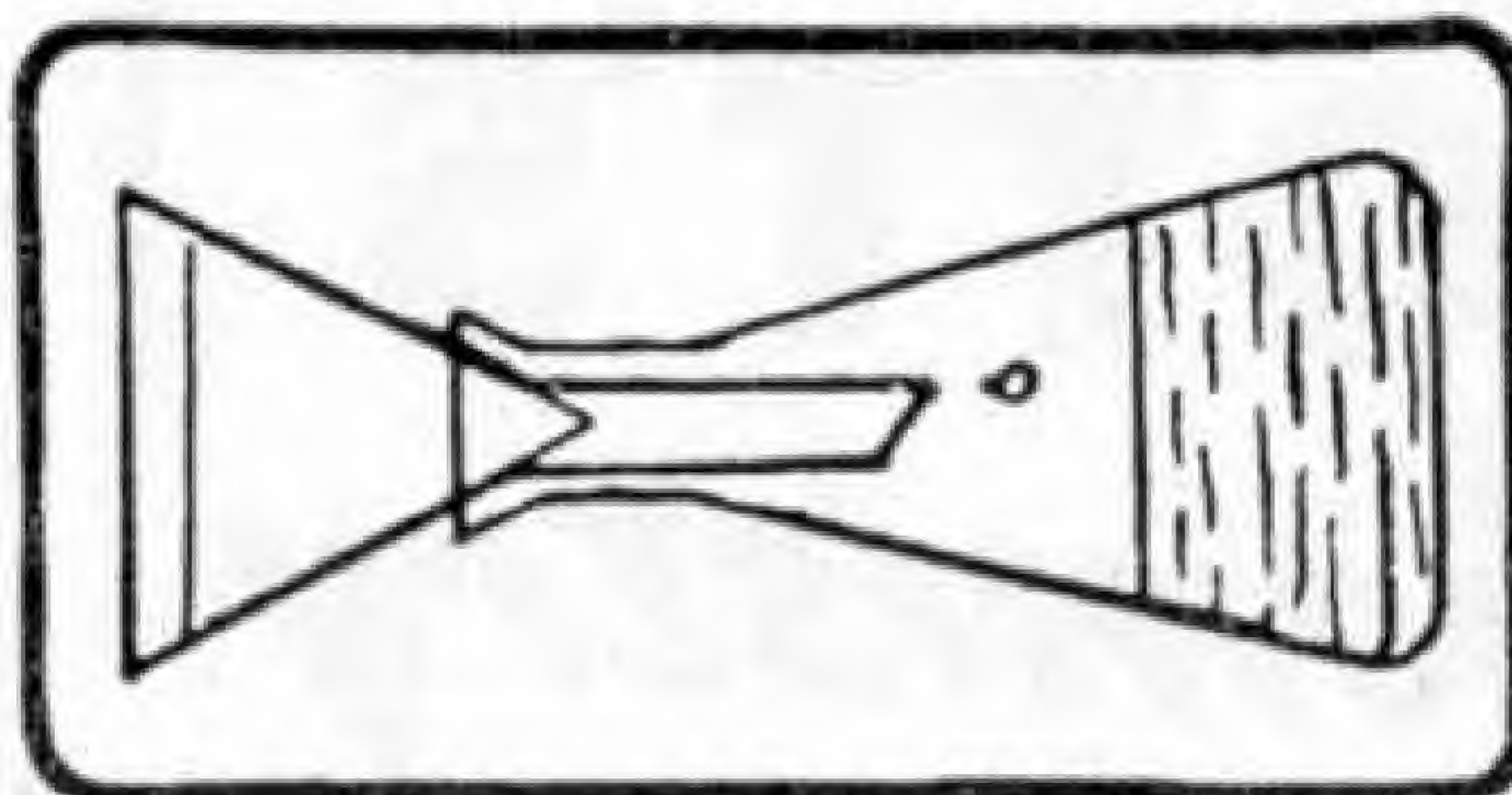
General Secretary:

BRITISH SAILORS' SOCIETY

680 Commercial Rd., London E.14. (Tel. East 4191)



A.D.P. CHEMICALS & APPARATUS



We can offer
a large selec-
tion of equip-
ment suitable
for students
& beginners,
send stamp
for list.

Special! Trial Package

COMPRISING APPARATUS & CHEMICALS SUITABLE FOR
BEGINNERS. **PRICE 7/6.** Post & Packing 1/3.

14 (D/MM) SURREY ROAD, BARKING, ESSEX

THEY'RE SMASHING

**Send 1½d. stamped, addressed
envelope for full details of our
new easy-to-build Rex OO
Wagon Kits.**

NOTE NEW ADDRESS:

ERG (Bournemouth) LTD

729 CHRISTCHURCH ROAD, BOSCOMBE
BOURNEMOUTH

MAKE LARGER PRINTS

with the JOHNSON

POSTCARD ENLARGERS

from $2\frac{1}{4}$ in. \times $3\frac{1}{4}$ in. or 35 mm. negatives

Expense need no longer deter you from buying an enlarger. With the Johnson Exactum Postcard Enlarger you can make postcard-size prints from $2\frac{1}{4}$ in. \times $3\frac{1}{4}$ in. (box camera size) or 35 mm. negatives. It is as simple to use as a contact printing frame. No focusing is required and there are no adjustments to make. Full instructions are enclosed with each Enlarger.

No. 1 $2\frac{1}{4} \times 3\frac{1}{4}$ in. negatives to POSTCARD.

No. 2. 35 mm. negatives to POSTCARD.

51/- each

MAKE BETTER PRINTS WITH JOHNSON UNIVERSOL DEVELOPER

Johnson Universol Developer is highly concentrated and contains Johnson '142' for preventing fog and stains, and '326' wetting agent to promote even development. Universol is excellent for developing both contact and bromide papers, producing a rich image colour with a full range of tones. Full instructions accompany every bottle.

225 c.c. (8 oz.) size.....2/9 each

570 c.c. (20 oz.) size.....4/6 each



JOHNSONS OF

HENDON LTD

THE WORLD-FAMOUS MANUFACTURERS OF PHOTOGRAPHIC CHEMICALS, APPARATUS AND ACCESSORIES.

LONDON N.W.4. ESTABLISHED 1743

RAILWAY ACCESSORIES

'OO' SCALE - HAND FINISHED

STANDING AND FEEDING SHEEP (set of 11) ..	2/5
FARMER, DOG AND PIGS (set of 10) ..	2/5
STATION STAFF (set of 5) ..	2/-
WATCHMAN'S HUT AND WORKMAN ..	2/6
FARM CART WITH MAN ..	2/3
W. H. SMITH'S BOOKSTALL ..	4/6
MILK CHURNS (set of 12) ..	1/6
COAL BUNKER WITH MAN AND SCALES ..	4/-
CYCLE RACK WITH 4 CYCLES ..	2/-
ESSO OIL DRUMS (set of 3) ..	1/3

Send 2/6 for samples (6 different) and lists of over 150 other models. Lists only, 5d.

HANNANT'S (Dept. G)

56 London Rd. Nth., Lowestoft, Suffolk

WEBLEY AIR PISTOLS

Marvellously accurate for target practice

No licence required to purchase for use on enclosed premises.

Write for Catalogue of Air Pistols, Air Rifles and Accessories.

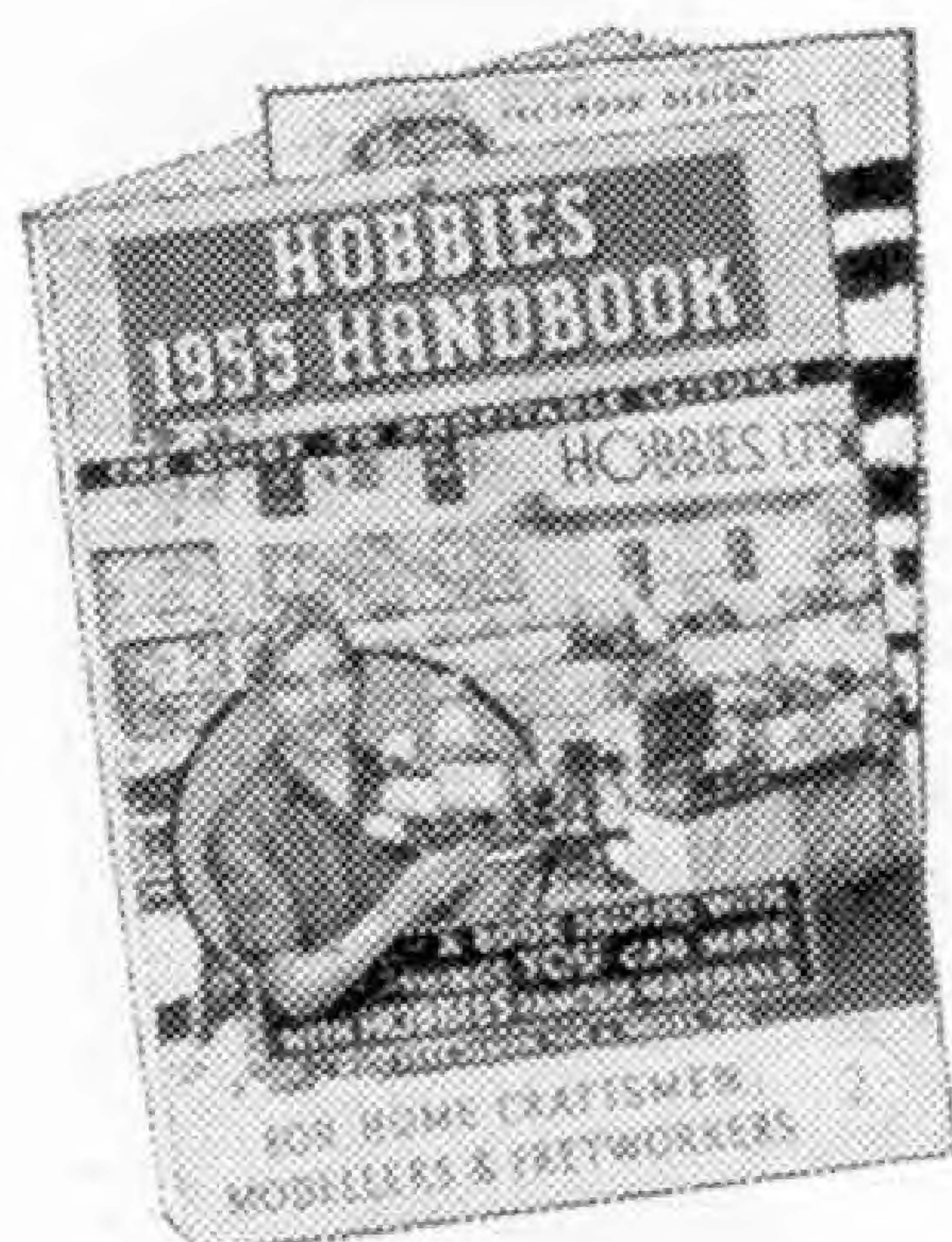


WEBLEY & SCOTT LTD.,
87, Weaman Street, Birmingham, Eng.
W.S.S.R.

BOND'S MODEL RAILWAY FITTINGS

Brass Solid Buffers. Gauge 00	0	1
Wagon type	4d.	5d.
Coach oval type with square base	5½d.	9d.
Gauge 0	0	1
Brass Spring Buffers. Round head with square base	1/2	2/6 each
Oval head with square base	1/6½	2/10 each
Gauge 00	0	
Brass Funnels. Standard type (L.M.S., L.N.E.R., G.W.R., S.W.R.)	1/-	1/6 each
Brass Domes. Standard types (L.M.S., L.N.E.R., S.R.)	1/3	1/9 each
Brass Ross Pop Safety Valves ..	6d.	6d. pair
Alloy Wagon Axleguards. Super detail	5½d.	4d. each
Brass Driving Wheels. White plated, for gauge 00		
24 mm. or 26 mm. diam.		2/1 each
Brass Coach Bogies. Gauge 00, L.M.S. pattern		14/9 pair
Gauge 0, L.M.S. pattern		22/6 pair
Gauge 0, L.N.E.R. pattern		32/- pair
Gauge 1, L.M.S. pattern		62/6 pair
Alloy Tender Axleboxes and Springs. Gauge 0		
L.M.S. or G.W.R.		9d. each
Brass Point Fittings. Gauge 0. Fork Joints	5d.	
each. Couplings	3½d.	each. Rod Guides 3½d.
each. Horizontal Cranks	8½d.	each. Point Levers 3/- each.
Postage and Packing extra.		
BOND'S CATALOGUES. Bond's Gear, Tool, Steam Fitting, Electric Motor and Material Catalogue, 1/6. Bond's Model Railway, Boats and Aeroplanes Fittings and Castings, 1/9.		
BOND'S O' EUSTON ROAD LTD.		
357 EUSTON ROAD, LONDON N.W.1		
Est. 1887		
'Phone: Euston 5441-2		

Coming Attraction!



HOBBIES HANDBOOK

The 1955 edition of this famous Handbook, on sale 31st July, will be welcomed by craftsmen, modellers and handymen everywhere. The design sheet alone is worth the cost of the book, and the whole volume is packed with details of things to make and do. There is also a catalogue of tools, outfits, machines and accessories the craftsman is likely to require.

Ask your newsagent or Hobbies stockist to reserve you a copy, price 2/—, or use the form below and receive your Handbook by post, price 2/3, post free.



To **HOBBIES LTD., DEPT 96,**
DEREHAM, NORFOLK

Please send me, when ready,
copy/copies of Hobbies 1955 Handbook.

I enclose P.O. for.....

NAME.....

ADDRESS.....

★ **FREE** Design for a Grand Model Tug

★ **"How-to-Make"** Articles

★ Full details of Hobbies Famous Kits

THE BACK NUMBER SPECIALISTS CAN HELP YOU

Meccano Magazines				each
Before 1939	..	..	..	1/—
1939–1943	..	..	..	9d.
1944–1949	..	..	..	6d.
1950–1952	..	..	..	9d.
1953–Date	..	..	..	1/—
Model Railway News	..	}	Any	
Model Railway Constructors	..		6d.	
Model Engineers	..		each	
Railways	..		each	
Railway World	..	..	1/—	
Railway Magazines	..	..	2/—	
Trains Illustrated	..	..	1/6	
Every Spotters' Weekly	..	..	6d.	
Railway Modellers	..	..	1/—	
Glossy P.C.s of Buses, Trams and Locos.	..	..	6d.	
Cigarette Cards, 50 for 1/— or sets	..	..	1/6	

Write or call.

LENS OF SUTTON

50 Carshalton Road, Sutton, Surrey

BOOKS:

Model Railway Pocket Book	..	..	1/—
Layout Plans	..	No. 1, 1/3; No. 2,	1/3
Scenic Modelling	..	..	1/9
Trix Year Book and List	..	..	2/6
British Standard Locos.	..	..	1/6
RAILWAY ACCESSORIES:			
Min. Pea Lamps, 2.5 volts	..	each	1/—
Min. Pea Lamps, 14 volts	..	..	1/2
Spare Sockets for bulbs	..	..	4½d.
14v. C/light Signals and Switch	..	..	19/6
Station Lamps, 3–4 volts	..	..	5/9
Water Columns	..	..	2/—
Working Ground Signals	..	..	2/7½
Imitation Coal	..	..	9d.
Small Bushy Trees	..	..	2/6

Postage extra New "00" or "0" Parts List 6d. per post.

TYLDESLEY & HOLBROOK (M.E.T.A.)
109 DEANSGATE, MANCHESTER 3

Send a 3d. stamp for our new list of
LINCRAFT de LUXE 1/72 SCALE
SOLID MODEL AIRCRAFT KITS

which include all the latest jets and 1914–1918 aircraft. Complete in every detail. Nothing more to buy when you have a LINCRAFT kit.

WILMSLOW MODEL CO.
Water Lane, WILMSLOW, Cheshire

L.M.R., W.R. AND SCOTTISH R.
LOCOMOTIVE ALLOCATIONS

PRICE 1/— each, Post Free, from
R.C.T.S. HON. PUBLICATIONS OFFICER,
18 HOLLAND AVENUE, CHEAM, SURREY

SHORTHAND in 1 Week. Test lesson 2½d. stamp.
Duttons (MO/SV), 93 Gt. Russell Street, W.C.1

YOU Can Draw Like A Master



Anyone can draw at once the easy way with the Magic Image Projector. Astonishingly life-like drawings of your family, friends and pets. Make your own Greetings cards and pictures from life. **5/11** each. Pack and Post 9d.



The amazing Clocko—the automatic artist—will draw over a quarter of a million funny faces to astonish your friends. Full instructions enclosed. **2/6** each. Pack and Post 4d.



Electro-plating at home with Easiplate. Skilled results first time. Detailed instructions enclosed. **12/6** each. Pack and Post 1/6.



Your own scale model of the famous "Mayflower" is easy to build with a Kleeware construction kit. **4/1** each. Pack and Post 7d.

Hamleys

ESTD 1760
HAMLEY BROTHERS LTD

The Finest Toy Shop in the World.
200-202 Regent Street, London W.1.
(our only address) Tel. REGENT 3161.

COLLECTORS! TRY THESE! CIGARETTE CARDS



100 different cards **2/9** or 5 sets (250 cards) **10/-**

MATCHBOX LABELS
30 different **2/6**; 60, **5/-**; 120, **10/-**

CHEESE LABELS
25 different **1/9**; 50, **3/-**; 100, **7/-**

Or price lists above hobbies available **3d.** each.

STAMP PACKETS:

50 Australia ..	1/10	25 Honk Kong ..	3/6
25 Bolivia ..	2/-	500 Hungary ..	10/6
100 Canada ..	6/-	25 Iceland ..	3/6
50 Croatia ..	2/9	50 Indo-China ..	4/-
100 Denmark ..	2/-	25 Liechtenstein ..	1/6
50 Ecuador ..	3/6	25 Malta ..	2/9
200 France ..	3/3	50 Portuguese Cols.	2/6

PLUS **2½d.** for postage. LIST of 325 different packets available for **2½d.** stamp.

E.H.W. LTD. (Dept. M), 12 Sicilian Ave., London W.C.1
(150 yards from Holborn Tube Station)

★ PLANS AND KITS FOR OVER 600 MODELS ★

THE NEW Modelcraft Handbook

features plans, kits and accessories.

Price only **1/-**, includes a full refund Voucher.

Send for your copy now to:

MODEL CRAFT LTD.

77 (H) GROSVENOR ROAD, LONDON S.W.1

Crystal Set Kits 17/6

Complete with instructions. Endless entertainment and no further expense. Ideal for School or College. Lightweight Headphones **15/11**. All post free.
W. Buckle (Dept. M), 77 Horringer Rd., Bury St. Edmunds

The History of Aviation

THE BOOK OF FLIGHT

By **KENNETH M. KING**

Illustrated by **KING-GANTEAUME**

5s. net

"The first 50 years of man's conquest of the air made up a half-century of amazing progress . . . This book traces some of the important stages in that progress."—*Meccano Magazine*.

4 colour and 6 half-tone plates, 37 line drawings.

Two Fine Stories

THE FLYING DOCTOR MYSTERY

By **JAMES M. DOWNIE**

7s. net

Murder and thrills in the bush-country of Northern Australia. A *Paragon Library* book.

THE DRAGON'S CLAWS

By **A. CECIL HAMPSHIRE**

7s. net

How the dreaded Dragon's Claws gang was broken up by a Naval Officer disguised as a poor Chinese fisherman. A *Paragon Library* book.

From any Bookseller

WARNE, LONDON W.C.2

ARE YOU INTERESTED IN RADIO?

Then build the amazing D.5.B. One Valve Receiver, ranges the Continent on a 22 volt battery, simple to build with our easy-to-follow diagrams. Highly instructive for the beginner in radio, will work anywhere with a short aerial and earth. Ideal for undisturbed listening, receives Luxembourg, Dutch, French, Italian, German and many other foreign stations. Fully detailed instructions and parts list sent for 1/6d. plus 1½d. stamp. Send to:

OCEAN RADIO (Dept. M/M)
HIGH STREET, LUTTERWORTH, LEICS.

STUDY AT HOME AND PASS!

Wolsey Hall (est. 1894) can prepare you by post for all G.C.E. exams.; London Univ. B.A., B.Sc., and many other exams. Moderate fees, instalments. Write for Prospectus to C. D. Parker, M.A., LL.D., Dept. GK91, WOLSEY HALL, OXFORD

COVENTRY TECHNICAL COLLEGE Session 1954-55 ELECTRONIC ENGINEERING

Applications invited for entry to 3 year full-time course commencing September, 1954, from those requiring comprehensive training to advanced level in ELECTRONIC ENGINEERING, qualifying for technical posts in radio, telecommunications, television and industrial electronics. Syllabus will cover requirements of C. & G., Brit.I.R.E., and I.E.E. examinations. Entry age 16 or over. Application forms and further information from Principal, Technical College, The Butts, Coventry.

READERS' SALES AND WANTS

SALES

Thirty Meccano Magazines in excellent condition, January 1948–October 1950 (omitting February '48, April and May '49). What offers?—Manton, 42 Blenheim Crescent, Leigh-on-Sea, Essex.

"M.M.s" July 1947–December 1951, good condition. What offers?—Kirkman, 101 Bury Road, Radcliffe, Manchester.

Eagle Projector, shows many Films, worth with Films, £4; price, best offer around £2/10/-.—J. Wiles, 7 Havering Gardens, Chadwell Heath, Romford, Essex.

Mamod Major S.E.2 Steam Engine, used once, £2.—Turner, 47 Cleveland Square, Newark, Notts.

Tri-ang No. 4: Passenger, precision Clockwork; 8 ft. 6 in. of Track, two Coaches, Engine, Passengers, Station Staff, Platelayers, Signal, Porters' Room, 30/-. Also Lucas King Sports Dynamo, used once, excellent condition, 27/-.—E. Kay, 13c Lewis Buildings, Liverpool Road, London N.1.

Collection of 122 (48 mint) different Railway Stamps, featuring Trains, Locomotives, Track, Bridges and Station, plus 80 swaps; 22/6 the lot (catalogue value over £3).—Dow, 11 Belsize Road, London N.W.6.

"M.M.s" 1945–1952 inclusive; good condition; what offers?; will sell complete or separately.—Marsh, 1 Knepp Close, Brighton.

"M.M.s" September 1944–March 1951; perfect condition; offers.—Barnes, Cantsfield Avenue, Ingol, Preston.

1,700 Stamps, mainly foreign (Cat. £15), plus Books, £5; 40 "B.O.P.s" 1950–1953, poor to good condition, 7/6; Pathescope 60 ft. Reels, 6d. each; eight "Tom Merry's," 6d. each; "Tom Merry's Own," 7/6; all plus postage. Required: "Pathescopes News Review of 1952."—Boon, 7 Marabout Bks, Dorchester, Dorset.

MECCANO MAGAZINE

Registered at the G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICES:

LIVERPOOL 13, ENGLAND.

Telegrams: "Meccano, Liverpool."

Readers' Sales and Wants. Private advertisements (i.e., not trade) are charged 1d. per word, minimum 1/-. Cash with order. Readers' advertisements are published as soon as possible; inclusion in the first issue after receiving them cannot be guaranteed.

"M.M.s" 1946–1951 bound (with covers and advertisements), 10/- per volume; 1952–1954 unbound, 6/- per vol.—R. Fotheringham, Fotheringham, Forfar, Angus.

Bassett-Lowke scale model electrically propelled "Barnett Stromness" type Lifeboat; 24 in. long; £3/15/-. Stamp for particulars.—J. H. Green, 321 Kingsway, Dundee.

Sixty-seven "M.M.s" for sale, January 1944–December 1949. Offers?—A. E. Sparrow, 1 Crowland Avenue, Hayes, Middlesex.

"M.M.s" June 1947 to December 1953 (March '53 missing); also seven before 1947. Offers.—Wilmot, 51 Lynton Grove, Bedford.

Few copies of "Railways"; S.A.E. for list.—K. Moden, 30 Peplins Way, Brookmans Park, Hatfield, Herts.

"M.M.s" bound, singles available, 1925–1940. S.A.E.—Lambert, 347 Gertrude Road, Norwich.

Stamps Cat. at £11; will sell for £3/10/- or near offer.—D. W. J. Ford, Hurston Farm, Whitestone, Exeter, Devon.

Trix Electric Railway: Goods and Diesel Locos., Rolling Stock, Rails, Points, Accessories, etc. S.A.E. for details.—Brockhurst, 106 Alexandra Road, Farnborough, Hants.

Small "Adana" hand-operated Printing Press, large quantity Type, etc.; cost £10; £6/10/- o.n.o., or will exchange for large Meccano Set. S.A.E. particulars.—P. Berry, 82 London Road, Sittingbourne, Kent.

Palitoy Electric Train for sale, as new, £2; complete with Batteries and Transformer. Apply—Styles, 43 Melbourne Road, High Wycombe, Bucks.

"M.M.s" January 1940 to November 1945, good condition. Offers to—Creswell, 16 Oakfield Grove, Manchester 18.

Ever Ready Electric Train Set consisting of 12 Rails forming a 4-foot diameter circle and two Coaches, also a driving Coach, £2/15/-. Hornby 0 Gauge pre-war 0-4-0 Tank "G.W.R." green, 15/-. All in good condition.—G. Williams, Brynave, Talybont, Conway, Caerns.

WANTS

Two back number "Champions," Nos. 1634 and 1669, wanted urgently; must be in excellent condition. Exchange for three different Biggles Books. Also four Biggles Books for sale, 15/-. Full particulars—Robin Kirk, 1 Tweed Street, Oamaru, New Zealand.

Pre-war Dinky Toys wanted, condition immaterial provided unbroken; not Cranes or Tractors; Cars only, with or without Tyres. Remittance by return. Post to—Sheen Models (Dept. E), 263 Upper Richmond Road, East Sheen, London S.W.14.

Train Set, layout considered, Lionel or Marklin preferred, M.R.C., M.R.N. Model Railroader, etc. Super Dinky Toys.—Craven, Ives Farm, Mansfield.

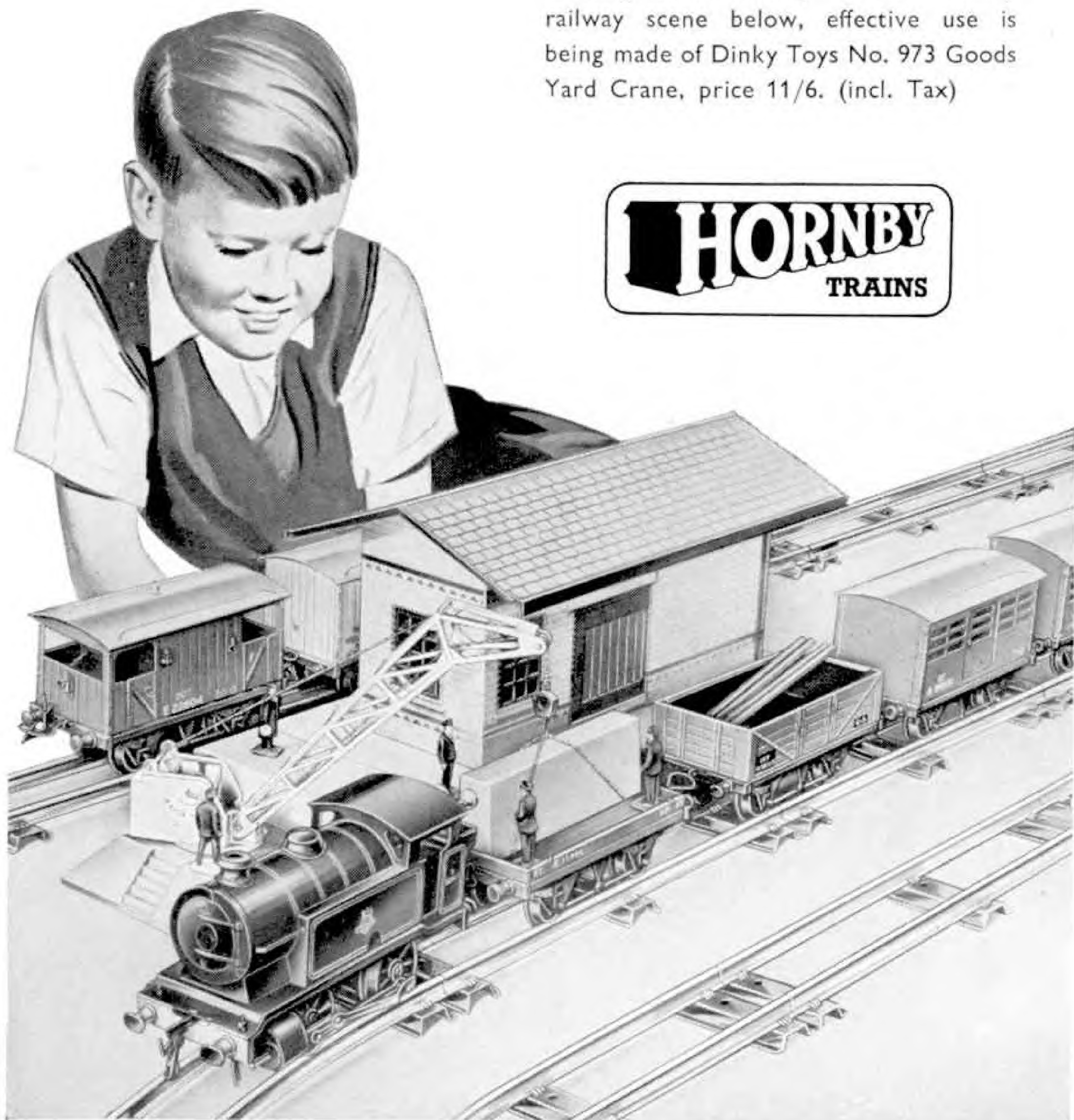
Obsolete Meccano Parts: 63a, 66, 67, 104, 105, 106a and 107. Must be in good condition. Price and particulars to Box No. 83.

Any Super Model Leaflets, Pre-war Meccano Leaflets. Also Meccano Book of Prize Models. Any condition, state price.—Mercer, 250 New Brook Road, Atherton, Nr. Manchester.

Load up the Goods!

What opportunities there are for lasting fun with a goods depot made up of Hornby equipment. Hornby Clockwork locomotives—now in British Railways colours—are long-running and strong-pulling, and there is a variety of rolling stock and accessories to build up an exciting model railway. In the Hornby railway scene below, effective use is being made of Dinky Toys No. 973 Goods Yard Crane, price 11/6. (incl. Tax)

HORNBY
TRAINS



A new model EVERY day

Every day throughout the year, a boy can build a new model with Meccano . . . 365 toys in 12 months using the same parts over and over again. Small wonder Meccano is the world's most popular constructional toy.



★ Many attractive up-to-date models are included in the new Meccano Books of Instructions. Two examples are illustrated here.